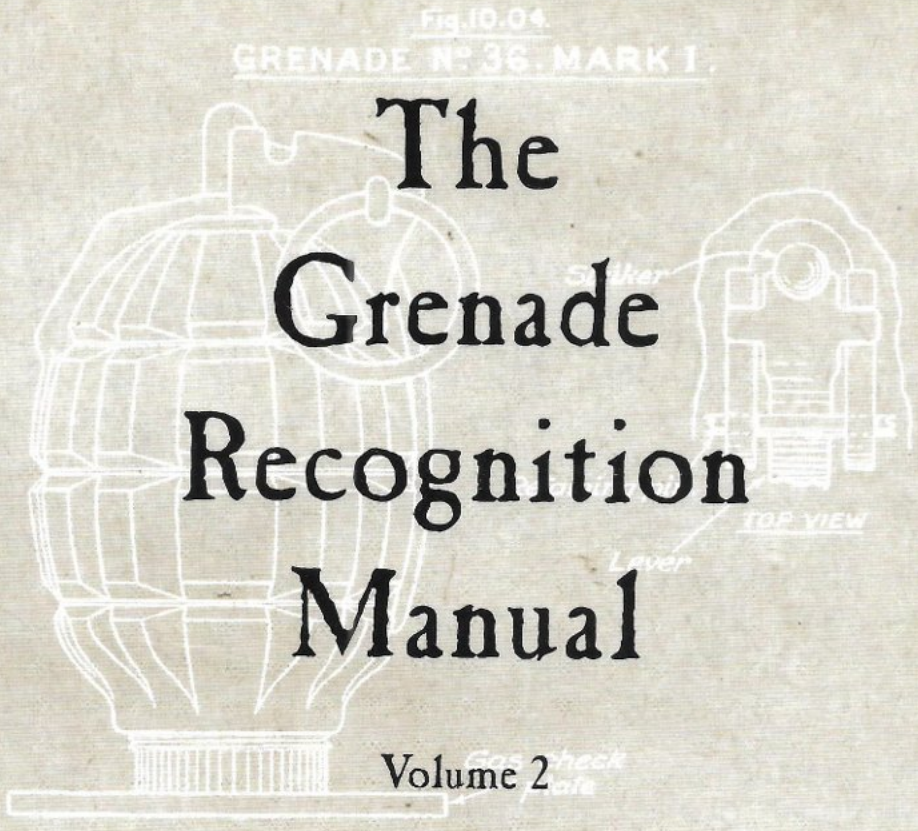
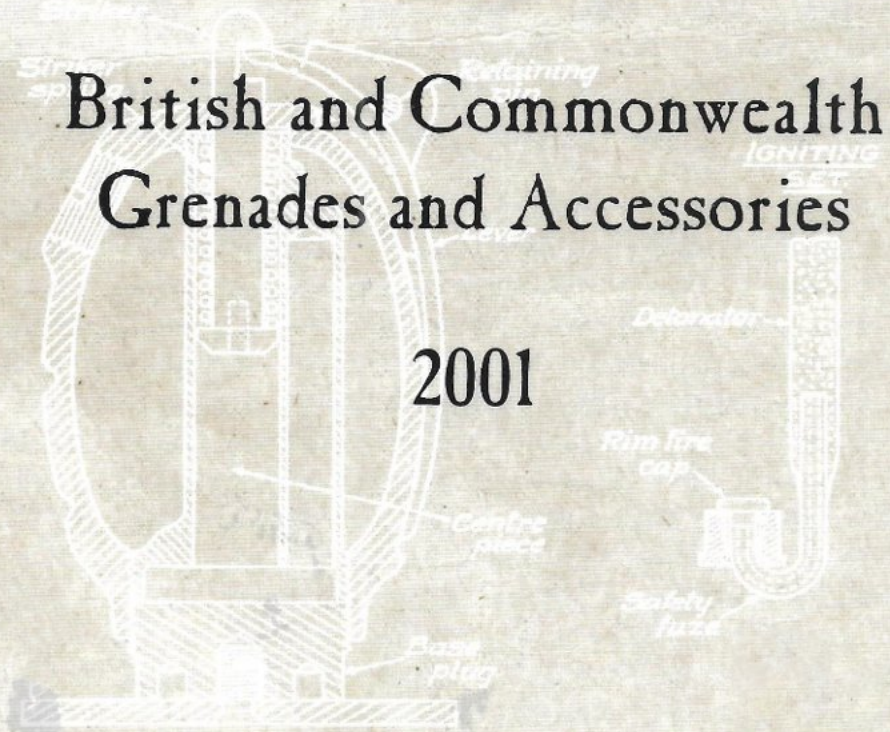


The Grenade Recognition Manual

Volume 2

British and Commonwealth Grenades and Accessories

2001



Darryl W. Lynn

Edited by Norman Bonney

The Grenade Recognition Manual

Volume 2

British and Commonwealth Grenades and Accessories

2001

Darryl W. Lynn

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D.W. Lynn
Victoria B.C.

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This edition first published in Canada
April 2001 by
D.W. Lynn
Victoria B.C.

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ISBN 0-9688909-0-3

National Library of Canada Cataloguing in Publication Data

Lynn, Darryl W., 1953-
The grenade recognition manual

Includes bibliographical references and index.
Contents: v. 1, US Grenades and Accessories -- v. 2, British and Commonwealth Grenades and Accessories.
Vol. 1 published by Service Publications.
ISBN 0-9699845-7-X (v. 1). -- ISBN 0-9688909-0-3 (v. 2)

1. Grenades. I. Title.
UF765.L95 1998 623.4'5114 C98-901032-5

Printed and produced in Canada by
Hillside Printing
3050 Nanaimo Street
Victoria, BC V8T 5A6

Cover design by Hillside Printing

Authors Note

Grenades are an often-ignored weapon in the arsenal of the Infantry soldier. There have been many books written on the Small Arms used by the countries of the world but all too often the authors simply gloss over the grenade providing information only on the most commonly known grenades. These manuals are an attempt to address that shortfall. In this, the second of my books, I have detailed most if not all of the British Service grenades in as much detail as has been possible. The scope of the manual is mainly 20th Century but I have also provided a very short history of British use of grenades from 1647 to the present. This has been a most interesting project; I have learned more about British grenades in the past three years than I had in the previous thirty. I hope you, the reader, will find this every bit as interesting to read as I found it to write.

You will note only three main sections on grenades, British, Australian, and Canadian. These are of course not all the countries in the British Commonwealth, however they are a good representation of the countries. For the most part, Commonwealth countries have followed a similar pattern in the adoption of grenades. New Zealand for example used British and Australian grenades up until Vietnam when they started to adopt some American grenades. Generally speaking, the grenades represented in this book cover most of the Commonwealth.

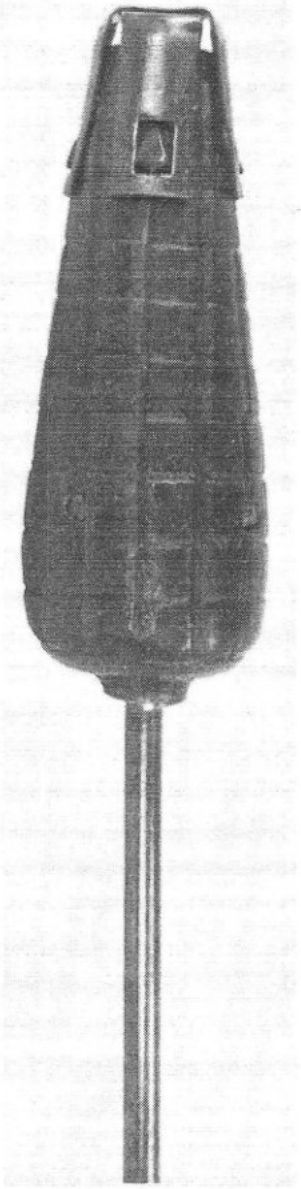
Some of the photos and diagrams used in the book leave something to be desired, however, I am of the opinion that a poor photo or diagram is better than none. As you can imagine, photos of some of these grenades are very difficult to find. Fortunately I have had the assistance of many people throughout the world in my quest to find them and you will see the results throughout the book.

The research for this book has been worldwide; I have received information from Britain, Canada, Australia, New Zealand, United States, Germany, Holland, and France. I have received invaluable assistance from many people, most especially Norman Bonney, in my opinion the world's foremost expert on British grenades. He has been kind enough to act as the editor and has been a wealth of information especially on the more obscure information that cannot be found in any book (until now that is). Without his invaluable assistance, and the assistance of the people and institutions listed below, this book would not be possible.

My thanks go out to the following people for their assistance in the production of this book. Norman Bonney, F.L. Dragon, Clive Law, Rolf Simonsen, Bob Perkins, Gary Oakley, Peter Ritchey, Ken Francis, Ray Ford, Rick Larson, Mike Etzel, Rick Landers, Leo Monkivitch, Robert Morgan, Kathy MacKenzie, and Dave Walker. I have also received assistance from the following institutions, The Canadian Scottish Regimental Museum, 5th Field Battery, Royal Canadian Artillery Museum and Archives, 11 Svc. Bn . Museum and Archives, Massey Library, Royal Military College of Canada, and the National Archives of Canada.

To you, the reader, my thanks for purchasing your copy and my hopes that you will find it worthwhile.

D. W. Lynn
Victoria, B.C.
April 2001



Newton-Pippin Rifle Grenade

Photo - Norman Bonney

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Editors Note

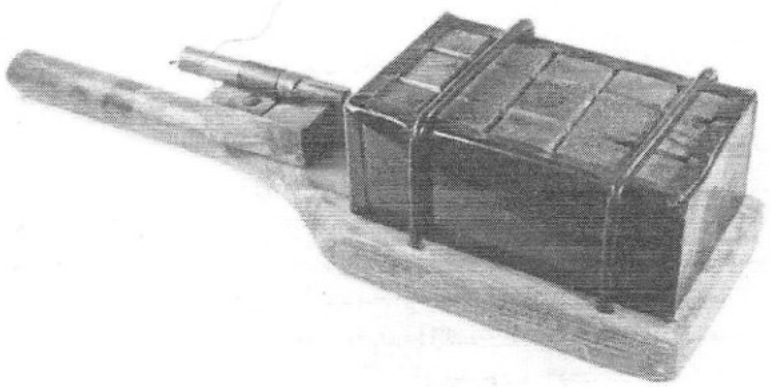
I was delighted to be asked to edit this the second volume of Darryl Lynn's series on grenades. Our acquaintance is as remarkable as the subject matter itself having been forged entirely as a result of the Internet revolution and thus far our knowledge of each other remains entirely electronic. Darryl's web site started just a few years ago as a modest exposure of his relatively new interest in grenades. Since those early beginnings his reputation, and that of his web site, have steadily grown to attract a large number of serious collectors and researchers as well as 'professionally interested' parties involved in law and order or in the field of explosive ordnance disposal. In creating this focal point he has done much to stimulate historical research into the subject and to promote the exchange of information between a small but significant worldwide audience.

In addition to his use of material acquired as a result of his own detailed research Darryl has brought together much officially produced data from old textbooks, training manuals and technical regulations. Many of the documents used have long since been thrown out of the offices and libraries of the organisations for which they were written and their survival has been largely due to chance. By making use of this source material for his book he has produced an authoritative volume which will save the collector or curator much 'leg work' in the identification of exhibits.

Editing the book has been a happy experience and the cause of a substantial number of forays into my own historical research notes on the subject. I have carefully screened the text for myths, such as the use of Hales Grenades by the Japanese in their war with Russia or the No 34 Mark IV being designed for discharger use, and can say that there are none included that I am aware of. My knowledge of grenades specific to Australia and Canada is limited and consequently I have not suggested any content changes to these excellent chapters.

Finally I should say that my association with the British military, albeit only as a part-time soldier, has precluded me from contributing to, or making editorial comment on, the chapter on 'L Series' grenades.

Norman Bonney
Buckinghamshire, England



No. 12 Mk. I (Hairbrush)
Photo - Norman Bonney

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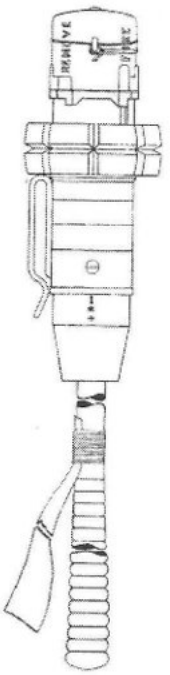

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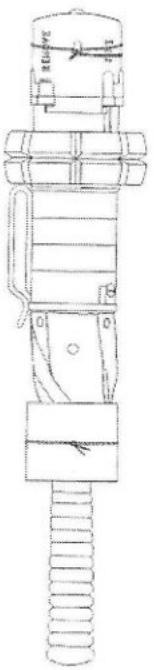

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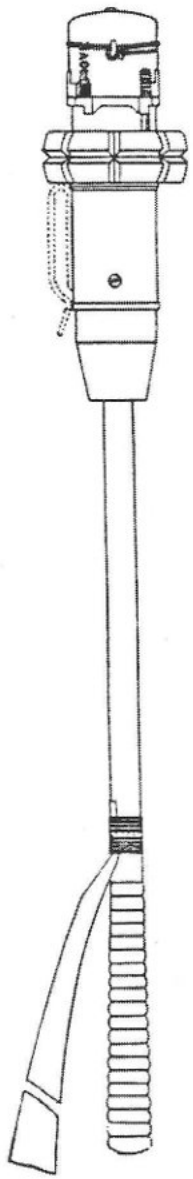

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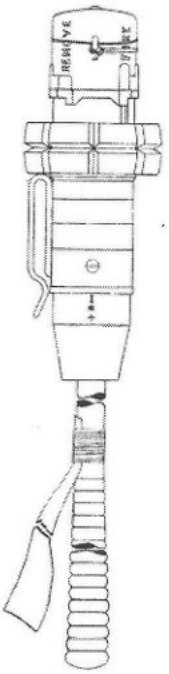

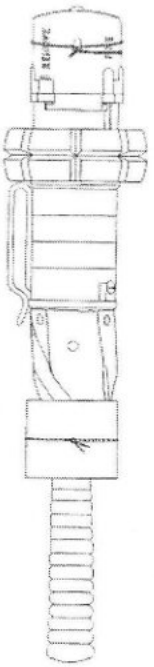

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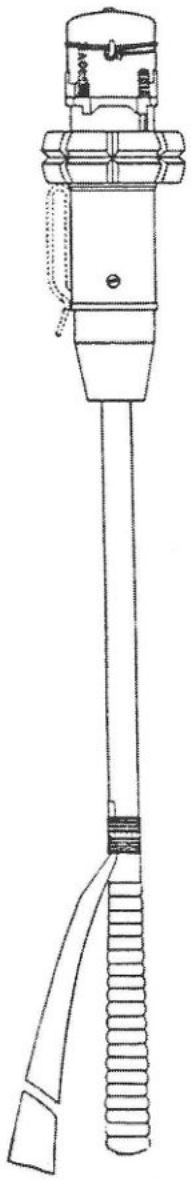

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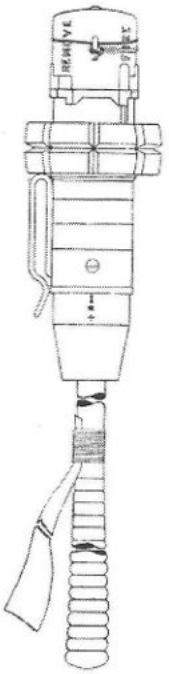

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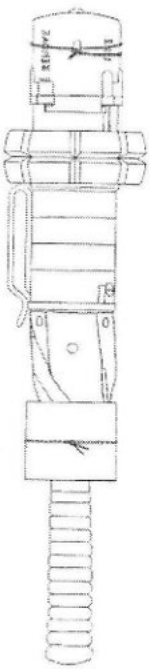

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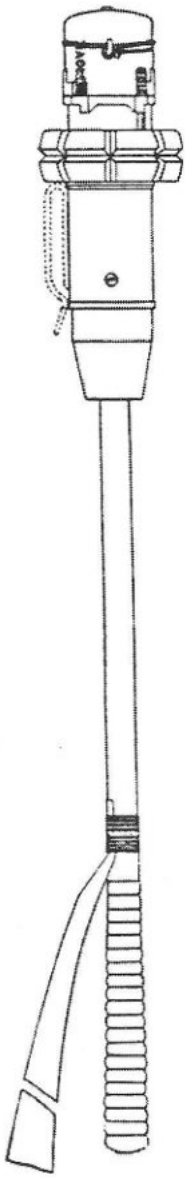

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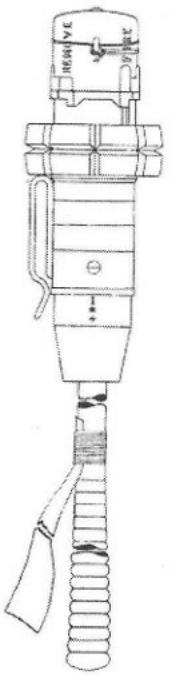

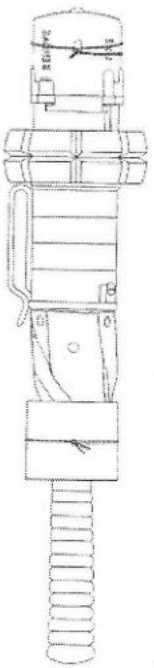

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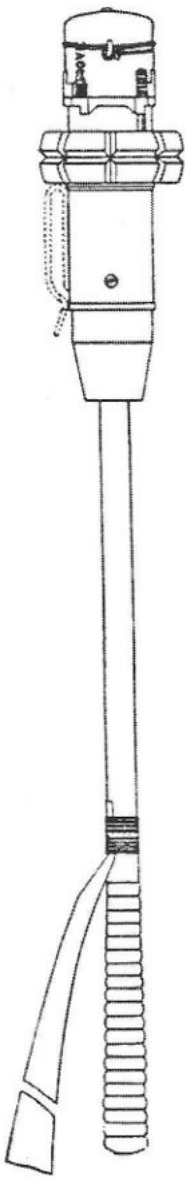

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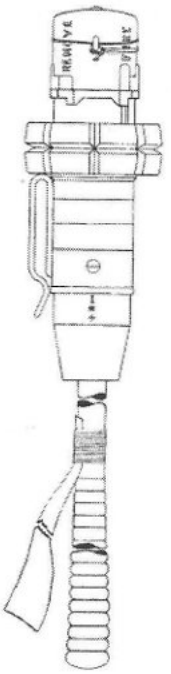
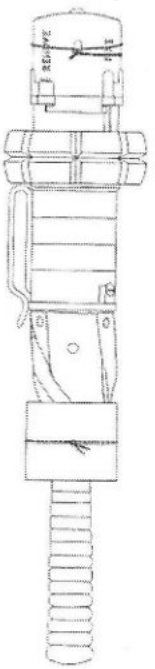
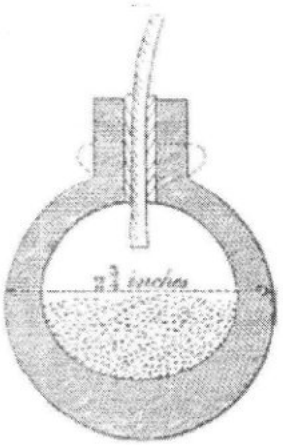




Introduction

British use of grenades can be traced back to at least the 17th century in the English Civil War when grenades are recorded as being issued to Parliamentary troops and later when they were officially recognized under an order of Charles I in 1647. *"Charles R. Whereas we had thought fit that two soldiers of each company now in the Tower of the Two Regiments of Foot Guards shall be trained and exercised by our Trusty and Well Beloved Captain Lloyd for the duty of granadiers... Whitehall 19th May 1647 By His Majesty's Command"* Little is documented regarding the use of grenades until later but these early grenades were mostly used for defense rather than offensive operations. It is known that the British used grenades to some extent in the Americas during the American War of Independence, and the War of 1812. These mostly took the form of a cast iron ball filled with gunpowder with a fuze sticking out a hole in the grenade body. The first known (by me) English manual on grenades called "*Instructions for Teaching the Method of Loading and Throwing Hand Grenades*" was produced for the Engineers School at Chatham in 1823. This describes grenades as "*Land Service Hand Grenades, weighing 1 lb. 13 oz*" or "*Sea Service Grenades weighing 4 lb. 2 oz.*". In addition it describes the use of 4 2/5 and 5 1/2 inch heavy shells as grenades.



An 1850 Aide-Memoire written by Lt. Col. Alderson R.E. includes a detailed account of glass hand grenades being used in Spain. "*Glass hand-grenades are sometimes made use of with good effect; they are much more portable than those made of iron, and much less expensive. These grenades are used in Spain at present, and have been since the early part of the 15th Century. They are made of common green glass of the dimensions shewn in the accompanying diagram. They produce sharp flesh wounds, and though, like other grenades, more generally used in the Defence of Posts, from their portability, be easily carried by infantry in the attack of Intrenched posts, particularly of stockades. The accompanying diagram represents the grenade now in use in Spain, with the exception of the fuze, which is here shewn as Bickford's slow burning fuze, instead of the common tubes used in Spain, which are apt to go out in the neck of the grenade, and not explode. The projecting neck of this grenade may, I think, be shortened with advantage, as shewn by the dotted line, as it is the part most liable to be broken, if it come in contact with a rock or wall when thrown from a height: the soldier should be instructed in those cases to roll it, whenever he can do so. A man can throw this grenade from 30 to 40 yards. The weight of a glass hand-grenade is 10 1/2 oz. Or 1/3 that of an iron one, when loaded with one ounce of powder, or a common musket cartridge, and about 2 inches in length of the slow-burning Bickford's fuze fitted into the neck, as shewn in the diagram; a little tow being wrapped around it, if necessary to make it tight. I have no doubt on further trial, both with powder and gun cotton, a much smaller space will be found sufficient for the charge, and that the glass may be proportionately increased in thickness, thereby giving larger splinters, and doing more damage. In the manufacture of glass hand-grenades, the greatest possible attention must be paid to the annealing process, as without this is thoroughly done, they will, on bursting, fly into thousands of minute particles, and become harmless*".

The British again used grenades in the Sudan (1884-1885), these were of the same pattern as the earlier iron grenades and used the same ignition methods with a fuze sticking out of a hole in the grenade being lit by whatever means are available. There must have been other use of grenades by British forces but information is scarce.

Grenades in the modern sense truly came into prominence during the Russo-Japanese war. All the grenades used in that war were of an improvised style but the value of the use of grenades was seen. After the war the Japanese adopted a grenade that became the basis of the British RL No. 1. Britain was fairly slow to take up the grenade but the Great War changed that.

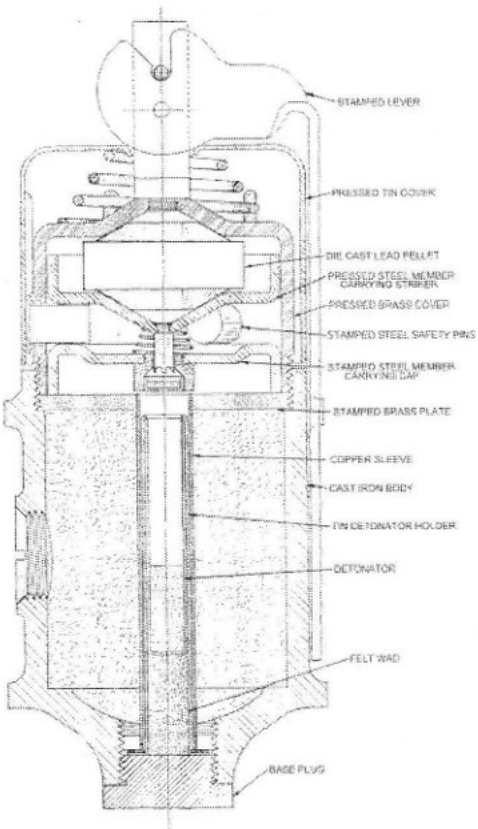
The First World War caught the British and their allies with their pants down in the grenade department. The "Treatise on Ammunition" of 1911 identifies the "Grenade, Hand, Mk. I (L)" as a service grenade, the only one in British service at the time and stocks were low. In 1914 when the war began the Cotton Powder Company was producing a grenade for the Mexican Army, as well as some for the French and Belgians, but none for the British Government. The production was requisitioned for British use becoming known as the No. 2 grenade. In addition the Hales "J" pattern rifle grenade was awaiting test at the School of Musketry and the Naval section of the Royal Flying Corps was testing the Hales Naval

Bellamy Type A

pattern, both in very small numbers. As a result many improvised grenades were developed at the front. The British geared up, producing a number of "Emergency Pattern" grenades to fill the gap, many of these were little more than better produced copies of those being made in the trenches. These included the Nos. 6, 7, 8, 9, 12, 13, 14, 15, and 16 grenades. The Mills was adopted in 1915 and set the stage for British grenade production for the rest of the century.

There were many other grenades designed that were not taken into official service, but that does not mean they were not used during the war, the "Hale Patent Time-Fuze Safety Hand Grenade" being just one example. Others included the Bellamy Type A, Bellamy Type B, and Humphries pattern. All of these may have been used at the front, but I have no confirming references. The Bellamy grenades were designed by a Captain Bellamy of the Royal Engineers. He designed the "Type A" otherwise known as the "GHQ Egg Pecussion Pattern" in 1917. Trial quantities were made in England in early 1918. The fuze used a tape safety arrangment which was not particularly liked. The "Type B" was designed at the Royal Engineers Experimental Station in France in 1918. It addressed the unpopular tape safety type fuze by replacing it with a new type using a lever safety. The fuze on the Type B was made substantially of metal stampings for ease of manufacture. During selection tests in early November 1918, the Bellamy Type A, Type B, and the CSOF grenades were to be manufactured in quantity for troop trials. The Armistice on 11 November, 1918 put an end to many contracts so it is unlikely that many were produced. In 1919 the "Bellamy Type B" found favour with the Second Army who recommended that it replace all HE grenades in service. Both of the Bellamy grenades could be fired from the 2 inch discharger cup, with the Type B having a range of up to 350 metres.

One person of particular note was Colonel Louis Jackson. He had been trained at the Royal Military Academy at Woolwich and had served overseas for much of his career beginning with Afghanistan in 1879. In 1895 he was appointed an instructor at the Military School of Engineering, Chatham and remained there until 1902. In 1907 he became the Assistant director of Fortifications and Works and in 1910 became the Chief Engineer of the London District. He retired from the Army in 1913 and on the outbreak of war in 1914 he was reappointed as an Assistant Director at the War Office. In 1914 Col. Jackson was the Assistant Director of Fortifications and Works. At this point, he was given the responsibility to come up with equipment that was suitable for trench warfare. In 1915 he became Director-General in the Ministry of Munitions and in 1916-17 he was Controller of Trench Warfare Research. Col. Jackson was not merely an administrator; he was intelligent and resourceful and was responsible for designing several grenades and evaluating much of the equipment used at the front, one such item being the Leach Trench Catapult.



Bellamy Type B Mk. III

Since the First World War, the British have been prolific in grenade design and production. The British numbered series started in the First War, running from the No. 1 in 1914 to the No. 95 in 1952. Since then, the British have adopted a new numbering system, the "L" series. Currently the "L" series runs from L1 up past L87. The exact number is not presently known as they are current grenades and information is difficult to come by. Not all of the "L" series grenades are of British design or production. The British Forces will adopt grenades from other countries for specific purposes and give them an L designation. One problem in identifying the "L" series is a duplication of numbering. Initially at least, the "L" grenades were given designations with several starting with L1, for example, the "Grenade, Rifle, Practice Marker, L1A1", "Drill Grenade (Discharger), Smoke, L1", and the "Grenade, Hand, Anti-riot, Irritant, L1A1". This

can lead to some confusion but when taken in conjunction with the rest of the designation a correct identification can be made. Unfortunately I have been unable to identify all of the L series although many of the missing numbers are "XL" grenades. "XL" grenades are experimental or trials grenades that have not been taken into regular service. I have included all that I have been able to identify and have some information on.

British designations are given in a specific manner to properly describe the item. For example "Grenade, Rifle, No. 20 Mk. I [L]": "Grenade" is the type of item, "Rifle" is a subcategory of the type, "No. 20" is the number of the grenade, "Mk. I" is the version of the grenade, "[L]" denotes it is for land use only. "[N]" would denote it is for Naval use only, and "[C]" would denote combined use. Many of the earlier British grenades use the letter "M" in a designation, for example "No. 23M Mk. I[L]". This denotes a grenade filled for use in hot climates. The original meaning of the "M" being Mesopotamia. The "L" series is designated in a similar manner. For the designation "Grenade, Hand, Signal, Smoke, Blue, L52A1", "Grenade" is the item, "Hand" is a subcategory of the item, "Signal", and "Smoke" are further subcategories, "Blue" is the colour, "L52" is the designator, and "A1" is the version.

It should be noted that the official dates of introduction for grenades may be well after the date that the grenades actually reached and were used by the troops. As well, the official date of being declared obsolete is likely well after the grenade was actually taken out of service.

British grenades are classified according to their use. The classifications normally used are:
1- Anti personnel, H.E. grenades
2- Anti tank grenades.
3- Smoke grenades
4- Signal and Illuminating grenades
5- Anti-Riot, gas grenades
6- Training grenades. Drill, Practice, Instructional

For the purposes of this book, I have classified the grenades into types that are generic throughout the book. This was necessary due to different countries using different names for the classifications. These may differ slightly from the designation of the grenade. The "Type's" used in the book are:

Fragmentation- includes all grenades designed to produce fragments.
Offensive- Includes grenades whose primary effects are achieved through concussion effects of the exploding grenade.
Anti-tank- includes all grenades designed to defeat armour by whatever means.
Gas- Includes all grenades that depend on the effects of a gas or irritant smoke to achieve the desired result.
Smoke-WP- Includes those grenades originally designed for the smoke effects of White Phosphorous but which also have an antipersonnel and incendiary effect.
Smoke- Screening- Includes those grenades whose primary purpose is to mask the movement of friendly troops.
Smoke- Signal- Includes those smoke grenades with a primary purpose of Signaling.
Illumination- Includes grenades with the primary purpose of providing battlefield illumination.
Signal- Includes grenades whose primary purpose is signaling, normally rifle grenades using stars or smoke streamers for signals.
Practice- Includes those grenades used for practice, these may include those that have spotting charges or may be only a cast representation in the basic shape of a grenade used for practice in throwing.
Drill- Includes grenades with a primary purpose of teaching the mechanism, identification, and use of a grenade. May include sectioned grenades but does not include those designed for throwing practice.

Improvised Grenades

When the British entered the First World War they were woefully short of hand grenades. The only grenades available were the Mk. 1 (later called the No. 1 Mk. I) and some requisitioned quantities of the Mexican 7mm Pattern rifle grenade, converted to hand use, which was later taken into service as the No. 2 Mk. I; both of these grenades were in very short supply. In addition, the School of Musketry, Hythe had about 50 of Hales "J" Pattern rifle grenades awaiting trials and the Naval Section of the Royal Flying Corps was testing around 100 of the Hales Naval grenade (later to become the No. 4 Mk. I) against balloons. The Germans used grenades against the British for the first time on the Aisne on 27 September 1914. At that point the British Expeditionary Force had none on hand. The Royal Engineers were directed to improvise

a "missile with which to reply to this latest device of the Germans" (ref: Military Operations France and Belgium 1914). As a result there were several patterns designed that were produced for use. Several used empty jam tins as a casing and are known by various names.

In fact the improvised grenades were in such demand that orders were issued regarding empty tins. In an extract from Part I Orders, dated 12 May, 1915, the 3rd Cdn. Inf. Bn. states: "From now on all empty jam tins will be collected by Coys. and Units and turned in daily to the Quartermaster." From the 8th, Cdn. Inf. Bn. Pt. 1 orders, we get "All empty jam pots must be cleaned and set aside by Battalions for future use as Grenades. O.C. 2nd Field Co., C.E. will arrange for removal of same." These two orders give an example of the importance being placed on the production of improvised grenades.

Documents obtained from Canadian archives give several "recipes" and instructions for the construction of grenades improvised from jam tins. The following are exerpts from those documents.

*"The recipe for making the "**jam pot**" hand grenade was; take a tin jam pot. fill it with shredded guncotton and tenpenny nails, mixed according to taste. Insert a No. 8 detonator and short length of Bickford's fuze. Clay up the lid. Light with a match, pipe, cigar, or cigarette, and throw for all you are worth. During the winter a French cardboard friction lighter was obtained; but this, unless secured by a tack, functioned almost at a touch, and was useless in wet weather."*

*"**Jam tin bomb**, made up to convenient weight to throw, consisting of a jam tin filled with scrap metal, with a bursting charge of two primers of Guncotton, (2 oz.), a No. 8 detonator, and a length of Safety No. 9 fuze to burn 5 seconds, the whole tied up in a piece of sacking. This is a very useful bomb, to use in teaching young bombers, only instead of using metal in your jam tin, use earth free from stones, and only ONE primer, with a detonator, or you may use GUNPOWDER tied up in a piece of sacking with safety No. 9. The harder you tamp the powder the better results you will get."* (ref: Bombs Bombers Bombing by Col. Sgt. Ins. J Coleman, RCR)

*"**Jam Tin Grenade**. The soldiers filled a jam tin with scrap metal, leaving room for half a pound of DYNAMITE or GUNCOTTON (if dynamite is used, a detonator, and Safety No. 9 is also used), and the jam tin is placed in another tin slightly larger, and the outer edge of the outer tin pressed over the inner tin. it is a very powerful bomb. If gun-cotton is used, you must use a primer of gun-cotton or your charge will not ignite; 5 seconds is the length of fuse, remember."* (ref: Bombs Bombers Bombing by Col. Sgt. Ins. J Coleman, RCR)

There were many other patterns of improvised grenades designed at the time. Another of note is the "Hairbrush" type.

*"**Hair Brush or Racquet Bomb.** This bomb takes its name form the shape of the piece of wood to which the explosive and missile are attached. To a piece of wood, 20 inches long, the shape of a hairbrush, with a hole through the back for the fuse, you attach a slab of gun-cotton, and a primer with detonator (fuse through the hole in the wood). On the face of a slab of gun-cotton you tie some metal in a sackcloth, or a piece of metal like a piece of a grate, the whole being secured to the wood by binding wire. This is a very popular bomb with the soldiers, who call it the hair brush bomb. The French call it the racquet bomb."* (ref: Bombs Bombers Bombing by Col. Sgt. Ins. J Coleman, RCR)

*"**Hairbrush Grenade** (with Jam tin body). The body consists of a circular jam-tin, height 3", diameter 3 1/2", containing 12 1/2 oz. cheddite. The lid for this can be made either from a second jam-tin, or from a circular piece of tin with the edges bent over. The handle is of wood, 18" long, similar to that of Box Hairbrush Grenade, except for the head, which is shaped to take the jam tin.*

Method of fixing body to handle.

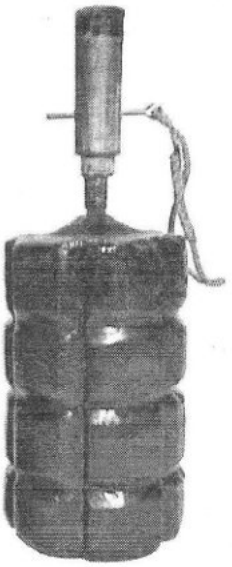
1. *Twist up two wires 18" long.*
2. *Drive four 1 1/2" nails through the handle and place the wire between them.*
3. *Make a hole in the side of the tin for the detonator, about 3/4" from the base.*
4. *Place the base of the tin on to the points of the four nails until it is in contact with the handle.*
5. *Bend over the points of the nails to secure the tin.*
6. *Fill the tin with explosive.*
7. *Put on the lid, and fasten it down by twisting together the four ends of the wires.*

Newton Grenade

These wires should be tightened by making bends at the sides with a pair of pliers.
8. All joints, including those round the lighter and detonator, should be well luted.

Means of Ignition. The grenade is fired by means of a friction igniter, safety fuze and detonator. The igniter consists of a copper tube, 3" long, covered in blue paper. It is fired by pulling a ring at the end of the wire passing into the composition in the friction tube. Fuse 8 cm. long. Time of burning 7 seconds. Joints are crimped and covered with luting when in position. The igniter is nailed to the handle by means of a narrow tin strap. A staple passes over the wire at the end of the tube, and acts as a stop for the igniter when the wire is pulled.
Safety arrangements. A paper band passes over the ring at the end of the wire, and is secured by a nail which passes through the middle of the ring."

*"In the "**hairbrush**" grenade a slab of guncotton was made fast by wires to a flat piece of wood of hairbrush shape, which afforded a convenient handle for throwing. It was ignited in the same way as the "jam pot" pattern."*
Another type of improvised grenade was the **Gas Pipe grenade**. Made from a heavy piece of cast iron gas pipe 2 inches diameter. The pipe was grooved to form segments that were expected to break up into fragments on detonation. The two-inch diameter of the pipe was required to fit the 1 ounce guncotton dry primer. In further documents it is mentioned that the pipe was 2 inch outside diameter, with walls 1/4" thick, and having an inside diameter of 1.5 inch. The pipe was to be grooved around its outer periphery with two sets of screw threads, a left-hand thread and a right hand thread. The grooves were to be "V" shaped and 3/16" deep. This left a thickness of only 1/16" of metal at the bottom of the grooves. The grooves were to be parallel and 3/4" apart on centre. The actual filling of the grenade is not mentioned in the documents but one can reasonably assume that any available explosive would be used, most likely guncotton.



Battye Bomb
Photo, Bob Perkins

A Captain Henry Newton (later Lt. Col. Newton CBE DSO) designed another type that can be included in the improvised grenades. This was known as the **Newton grenade** and was in fact produced in two types, the hand version and the rifle version (detailed later under the No. 22 grenade). The hand version was produced in the 2nd Army Workshop at the "Ecole Nationale Professionnelle" in Armentieres France. It consisted of a cast iron body shaped somewhat like a pear. The outside is segmented in what appears to be a rather haphazard style. A separator is cast part way down inside the body leaving a hole to fit the detonator off to one side. The side of the body is cut out on the same side as the hole to allow the proper length of fuze to fit; in fact the fuze protrudes out the side of the body. The top portion of the body has four lugs cast onto it. A sheet metal striker cap with the striker mounted centrally fits over the top of the body with slots in the cap engaging the lugs on the body and retaining it in place. The fuze assembly is made up of a shortened .303 inch cartridge case, 1.75 inch length of safety fuze, and detonator. The fuze assembly fits into the body with the cartridge case in the top, the fuze running slightly outside the body into the detonator contained within the lower portion of the body. The filling of Ammonal was contained in the lower section of the body. For use, the striker cap was struck on any convenient hard object to fire the percussion cap in the cartridge case that ignites the 4.5 second length of fuze. The grenade was immediately thrown.

The final type of improvised grenade I will discuss is the "**Battye Bomb**". These were designed by Captain B.C. Battye of the Royal Engineers. He initiated the production of these bombs in an iron works in Bethune. It consisted of a cast iron cylinder 4 inches long, 2 inches diameter and is closed on the bottom. The outside is segmented in half inch squares. The cylinder was then filled with explosive, normally Ammonal, and the top closed by a wooden plug. A central hole in the wooden plug allowed a fuze and detonator to be inserted. Large quantities of Nobel's fuse lighter were available in the coalmines at Pas de Calais, so these were adapted for military use and use on the grenade. Adaptation of the lighter involved adding a cap and safety pin.

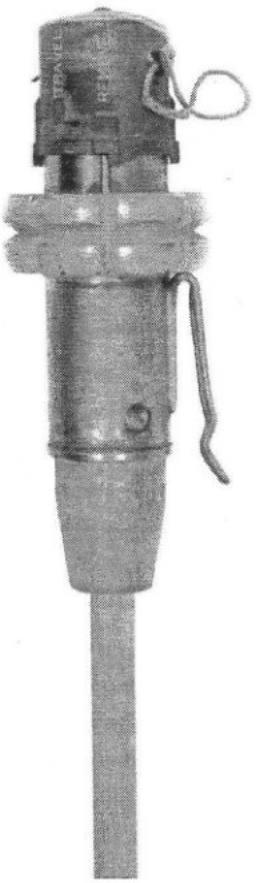
As you may imagine many of the improvised grenades proved to be less than reliable. In one instance a demonstration was being given in front of more than 40 generals and their staffs. The officer in charge of the demonstration threw a "Hair brush" with the result that only the stick went forward, the charge dropping off onto the ground. Some of the spectators fled, some crouched down to the ground, but no explosion took place. After waiting for a while, a search was made and the charge found, underneath one of the generals. As it turns out, a most fortunate general.

Numbered Series

Grenade, Hand, Mk. I [L] (R.L. Percussion Pattern)

TYPE- Fragmentation
WEIGHT- 1 lb. 11 oz.
HEIGHT- 5.75 in. body
21.75 in. w/handle
DIAMETER- 1.75 in. body
2.75 in. overall
IGNITER- Percussion/Impact
FILLING- 4 oz. 2 dr.

Adopted by the British Government in June 1908, the Mk. 1 later redesignated No. 1 Mk. 1[L], grenade served well into the First World War with several modifications. It was finally declared obsolete on 1 March 1920. Prior to the war, production of this grenade at the Royal Laboratories was about 100 grenades per year.



No. 1 Mk. I
Photo - Norman Bonney

The body of the grenade is made of solid drawn brass in a cylindrical shape. A hook is soldered to one side for attaching the grenade to a belt. A cast iron fragmentation ring is secured near the centre of the body by a projection on the body and solder. A brass disc is soldered in the body near the centre dividing the body into two sections. The upper portion is lined with asbestos and filled with a charge of 4 oz. 2 dr. of Lyddite. A cavity formed in the Lyddite is fitted with a hollow pellet of compressed picric acid lined with paper with the junction between the two covered with a paper disc and covered again by a composition. A flanged brass detonator holder fits into the centre of the picric acid and closes the end of the body. The detonator holder is held in place by three screws. Later issues may be filled with Trotyl or Lyddite and are fitted with an exploder of stemmed C.E.

The cap of the grenade is made of brass and has a steel needle riveted to the inside centre of the top. The top of the cap is then filled with lead. The cap is secured to the body by a double bayonet joint. There are three possible positions for the cap, "Remove", "Travel", or "Fire". All three of the positions are clearly marked on the cap. A safety pin fits through the cap and needle, preventing the needle from contacting the detonator. The pin is secured by a becket and leather tie.

The handle is made of cane, 16 inches long. The handle fits into a block of beech wood and is secured by two wooden pins that are glued and driven in. The block is then covered by a brass cup, fitted into the lower end of the body and secured by three brass screws. A silk braid streamer, 1.5 inches wide and 36 inches long, is attached to the handle approximately six inches from the end.

The Mk. I detonator is made of drawn copper and is filled with 30 grains of Fulminated Mercury. A brass cup holds the filling in place. The detonator is fitted into the grenade in the detonator holder and secured by giving the detonator a bit of a turn engaging its flange under two pins on the holder. The later issues were fitted with "Detonator, No. 1 hand grenade, Mk. II" filled with 34 grains of Fulminate of Mercury.

The grenades are marked with a red filling ring around the middle of the body. Grenades filled with Trotyl are identified by a green band painted on the body below the red filling ring. The manufacturers initials and date of manufacture will be stamped into the wood block immediately below the brass grenade body.

The grenade and detonator were shipped separately so it must be prepared for use. To prepare the grenade for use, turn the cap to the right until the word "remove" is aligned with the arrow painted on the body and remove the cap. Insert the detonator into its recess ensuring the two grooves on the detonator flange line up with the two studs on the detonator holder. Press the detonator gently then turn it to the left making sure the flange is under the heads of the studs until the brass plate spring releases and locks the detonator in position. Replace the cap with the word "remove" aligned with the arrow, press it down into position and turn it to the left until the word "travel" lines up with the arrow.

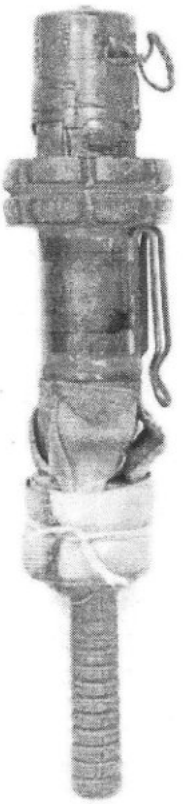
To throw the grenade, unwind the streamer and allow it to hang loose. Turn the cap from "travel" to "fire" and remove the safety pin. Grasp the end of the handle and throw the grenade using an overhand or underhand throw, ensuring the streamer cannot entangle itself on anything. The grenade should be thrown well upward to ensure it strikes the ground in

a position as close to vertical as possible. When the grenade strikes the ground, the needle is driven into the detonator causing it to fire and explode the grenade.

Grenade, Hand, No. 1 Mk. II [L]

TYPE- Fragmentation
WEIGHT- 1 lb. 11 oz.
HEIGHT- 12.75 in. w/handle
5.75 in. body only
DIAMETER- 1.75 in.
2.75 in. overall
IGNITER- Percussion/Impact
FILLING- 4 oz. 2 dr.

This grenade has the same general construction as the Mk. I but differs in several ways. The body may be of solid drawn brass or of sheet brass formed into a tube and brazed. It is closed at the top end by a brass disc with a detonator holder riveted and sweated into the centre. The bursting charge is filled through the lower end of the body. The handle may be made of cane pegged to a wooden block or the handle and block may be formed from a solid piece of wood. The handle has also been shortened to 8.5 inches. There are four tails, made of 1.5 inch webbing 22 inches long, attached to the projecting portion of the wood block. In transit the tails are wound around the handle and secured by a piece of twine.



No. 1 Mk. II
Photo - Norman Bonney

The filling may be Trotyl, Amatol 80/20, or Ammonal without exploders. If filled with Trotyl or Amatol the exposed surface is covered by a cardboard disc or paper if filled with Ammonal. The filling is then sealed by a layer of paraffin wax or beeswax composition. The handle block with brass cup attached is inserted while the wax is still molten.

This grenade may be fitted with "Detonator, No. 1 hand grenade, Mk. II" or "Mk. III". The Mk. III detonator is similar to the Mk. II but has the retaining spring formed by slitting the flange and bending the tongue up.

The body is unpainted with a red filling ring painted around the body one inch below the fragmentation ring. A coloured band immediately above that indicates the type of filling, a green band for Trotyl or Amatol 80/20 or a pink band for Ammonal. A fraction indicating the proportions of contents will be found if filled with Amatol. The fragmentation ring is painted yellow. The designation, a manufacturers mark, and the date of filling are stamped into the wood block just below the junction of the block and body of the grenade.

Grenade, Hand, No. 1 Mk. III [L]

TYPE- Fragmentation
WEIGHT- 1 lb. 10 oz.
HEIGHT- 12.75 in. w/handle
5.75 in. body only
DIAMETER- 1.75 in. body
2.75 in. overall
IGNITER- Percussion/Impact
FILLING- 3 oz.

This is an "economy engineered" version of the No. 1 grenade and is generally the same as the Mk. II but differs in the construction of the cap and body. The cap may be made of brass or phosphor-bronze as an alternative. The weighting washer inside the cap is cast iron or steel. The cap may be made up of the washer as an end and a piece of tubular brass with the end of the tube spun into a groove on the side of the washer. There are slots at the fire position that interact with stops on the body. Two indents are made in the cap and two projections to facilitate turning the cap. The cap fits the body tightly so that it will not turn with a pressure of five pounds but will under a pressure of 21 pounds.

The body may be made of phosphor-bronze as an alternative to brass. There are stops on opposite sides of the body to engage the lower edge of the cap. The stops prevent the entry of the cap except when the cap is turned to the fire position. The indentations on the cap engage indentations on the body at the remove position. A part turn of the cap causes one of the cap indents to spring into the travel indent on the body. When the cap is turned to fire the cap indents travel along a groove until they are opposite the fire indents on the body that extend down the body.

The fragmentation ring may be made in two parts or as a single piece. The ring is held onto the body by a projecting ring on the body and a fillet of solder on the opposite side of the ring. The carrying hook has the ends bent to conform to the

shape of the body and embedded in the fillet of solder. The handle and block are formed of a single piece of wood. Four streamers of 1.5 inch webbing, 22 inches long, are attached to the part of the block that projects out from the body of the grenade. During transit the streamers are wound around the handle and secured with twine.

The filling may be Bellite, Ammonal, or Amatol 80/20. The detonator will be the Mk. III. Detonators are issued with the grenades in a tin box inside a box of 10 grenades.

The grenade is marked around the centre of the body with a red filling ring and a pink band if filled with Bellite or Ammonal. A green band denotes a filling of Amatol 80/20. The designation and a manufacturers mark are stamped into the wood block immediately below the junction of brass body and wooden block.

Grenade, Hand, No. 1 Mk. IV [L]

This designation was assigned to a development of the No. 1 Mk. III incorporating a more easily manufactured detonator using a rimfire cap. Due to the significant differences that prevented any interchangeability, the grenade was eventually assigned a completely new number. This became the No. 18 Mk. I [L].

Grenade, Hand, for Instruction, Mk. I [L]

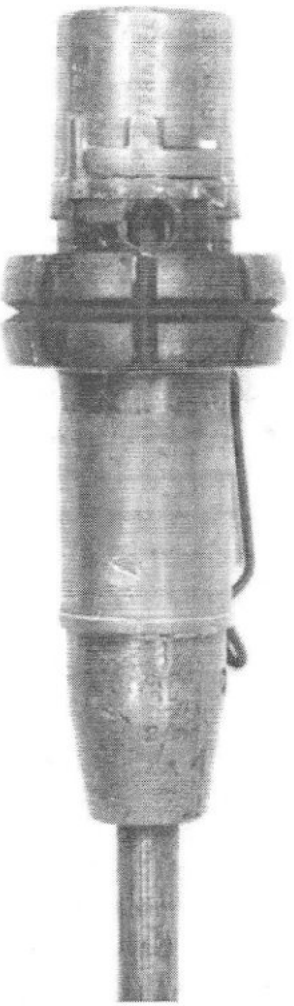
This grenade was later to become the "Grenade, Hand, for Instruction, No. 1 Mk. 1". It is made to closely resemble the service grenade but has the explosive replaced by a wooden block and has a dummy detonator filled with clay. The body of the grenade and the detonator will have holes drilled in them to identify them as dummy components. The body is stamped with the word "DUMMY" and has the stamped letters filled with red paint. The Mark of the grenade, manufacturers mark, and date of manufacture is stamped into the wood block below the brass body.

Grenade, Hand, for Instruction, No. 1 Mk. II [L]

This is the instructional model of the No 1 Mk. II grenade. It closely resembles the service grenade but has the explosive filling replaced by a block of wood and has a dummy detonator. The grenade will have holes drilled in the body and detonator. The word "Dummy" is stamped into the brass body and painted red. The designation and a manufacturers mark are stamped into the wooden block just below the brass body. The markings may be hidden under the webbing tails.

Grenade, Hand, Practice, Mk. I [L]

This grenade was designed to practice soldiers in throwing the grenade. The body is beechwood with a cast iron fragmentation ring fitted and a wrought iron cap. No safety pin is provided. The grenade is weighted with lead to match the weight of the service grenade. When issued, the grenade is provided with two spare handles, 16 inches long with one streamer 36 inches long. The fragmentation ring is painted yellow. The Mark of the grenade, manufacturers mark and date of manufacture is found stamped into the lower portion of the brass body.

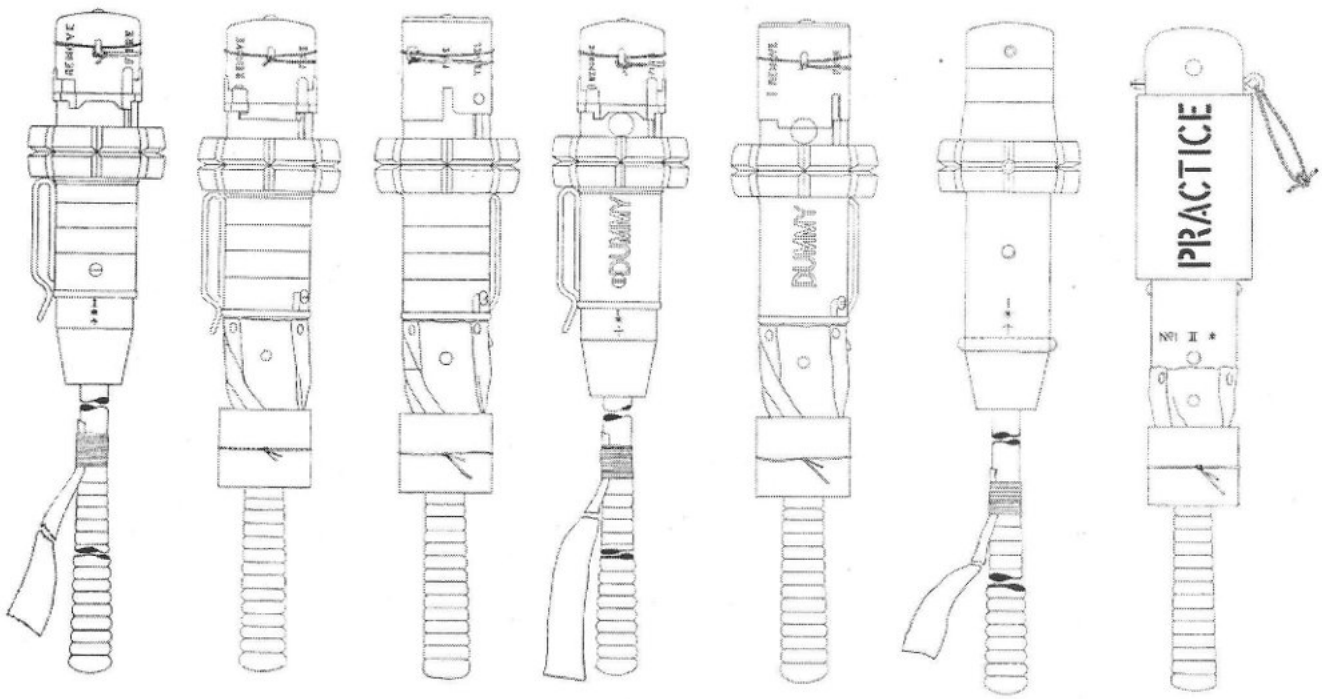


No. 1 Mk. I Instructional
Photo - Norman Bonney

Grenade, Hand, Practice, No. 1 Mk. II [L]

This grenade is made to resemble the short handled No. 1 Mk. II, No. 1 Mk. III and later the No. 18 Mk. I. It consists of a wooden body with a separate wood or cane handle with four streamers of 1.5 inch webbing, 22 inches long attached. The top end of the grenade is protected by a steel cap. A length of steel or iron tubing fits over the body giving it a distinctive shape and adding weight. A pin representing the safety pin passes through the steel cap and body. The body is painted white with the word "Practice" stenciled on it.

The designation and a manufacturers mark are stamped into the wooden body below the tubing.



Varients of the No. 1 grenade. From left to right
"Grenade, Hand, No. 1 Mk. I", "Grenade, Hand, No. 1 Mk. II", "Grenade, Hand, No. 1 Mk. III", "Grenade, Hand, for instruction Mk. I", "Grenade, Hand, for instruction Mk. II", Grenade, Hand, Practice Mk. I", Grenade, Hand, Practice, Mk. II
These diagrams have been taken from marking diagrams produced by the War Office.
They are not to scale with each other.

Grenade, Hand, No. 2

This grenade was officially introduced for service on 16 February 1915 and officially declared obsolete in February 1920. By the time it was declared obsolete it had actually been out of service for a number of years. Originally known as the Mexican 7mm Pattern due to the fact they were originally destined for Mexico under contract between the Cotton Powder Company and that country. The grenades were purchased in August 1914 and taken into British service as an interim measure at the start of the First World War.

The main body of the grenade is a cylindrical brass case. A cast iron fragmentation ring is mounted on the body near the top end. The ring is secured to the body by a rib in the body and solder. The body ends are brass plugs screwed into the main casing. A central tube is supported by the two ends. The central tube will contain the needle pellet, creep spring, and detonator. The needle pellet consists of a brass body with a steel needle mounted in the front end. The pellet is grooved on the sides to allow the free movement of air and prevent the pellet being held back by air pressure. The front end of the pellet is tapered with a groove formed into the lower end of the taper. The brass creep spring is of sufficient strength to support the pellet during the act of throwing. The lower end of the spring is sprung into the groove on the pellet. The safety pin is made of phosphor-bronze and passes through the lower closing plug on the body and through the needle pellet preventing its forward movement. In transit or storage, the upper end of the central tube is closed by an ebonite shipping plug.

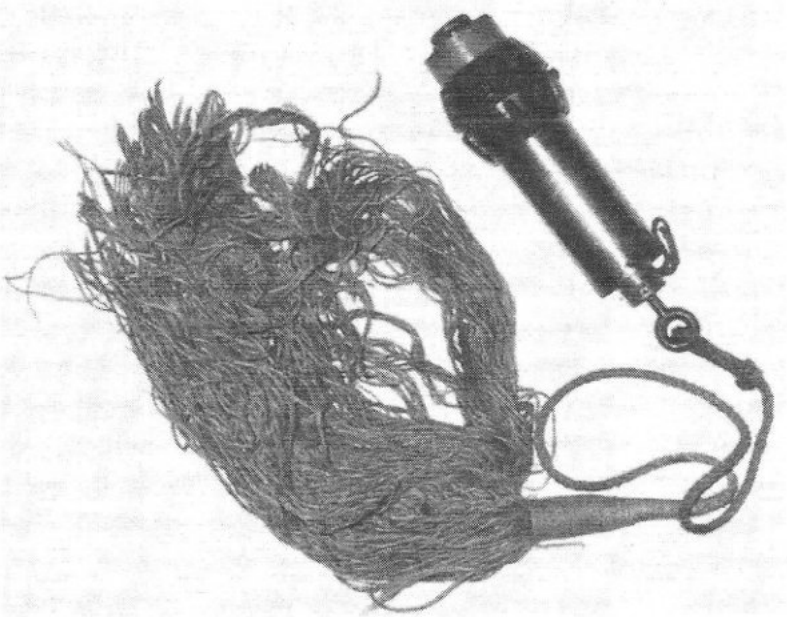
The "Detonator, No. 2 Hand Grenade, Mk. I" consists of a brass holder with a tubular extension divided into two compartments by an internal rib. The end compartment contains a primer secured by spinning over the end of the tubular extension. The detonator has four small holes in its closed end and contains 33 grains of Fulminate of Mercury. It is inserted in the other compartment with the closed end facing the primer compartment. A wooden plug is placed on top of the

No. 2 Mk. II
Photo - Bob Perkins

detonator and the holder is closed by a brass screw plug.

The grenade is filled with Tonite pellets perforated to fit over the central tube.

The handle consists of a cane or wooden handle inserted into a steel handle socket and secured in place by pins. A steel rod about 2 inches long and threaded on both ends, is screwed into the handle socket. The other end of the rod is screwed into the base plug of the grenade. A setscrew ensures the handle does not unscrew from the grenade. The handle may be of two types; a long cane handle with one long streamer or a short wooden handle with four short streamers.



No.2 with Rope Tail
Photo - Norman Bonney

The grenade is marked with a red filling ring around the forward end of the body. The lower portion of the body is marked with the manufacturers name, "Cotton Powder Co. Ltd.". Below the manufacturers name they are marked "HALES PATENT LONDON", and below that might be 8mm or 7mm. Those marked 8mm were originally for a French contract, those marked 7mm were for the Mexican contract. The iron fragmentation ring is painted black.

The grenade must be primed prior to use. The ebonite shipping plug is removed and replaced with the detonator assembly. For use, the safety pin is withdrawn, the needle pellet is then held off the detonator by the creep spring. When the grenade is thrown it travels head first due to the drag created by the streamers. When the grenade strikes the ground, the force of impact overcomes the creep spring, allowing the needle to hit the primer. The flash from the primer ignites the detonator that sets off the main filling.

TYPE- Fragmentation
WEIGHT- 1 lb. 3 oz.
HEIGHT- 21.5 in. overall
5.5 in. body
DIAMETER- 1 3/16 in. body
1 15/16 in. overall
IGNITER- Percussion/Impact
FILLING- 3.4 oz.

Grenade, Hand, No. 2 Mk. I

This model used the long 16-inch cane handle with a single steamer, 36 inches long.

TYPE- Fragmentation
WEIGHT- 1 lb. 2 oz.
HEIGHT- 12.5 in. overall
5.5 in. body
DIAMETER- 1 3/16 in. body
1 15/16 in. overall
IGNITER- Percussion/Impact
FILLING- 3.4 oz.

Grenade, Hand, No. 2 Mk. II

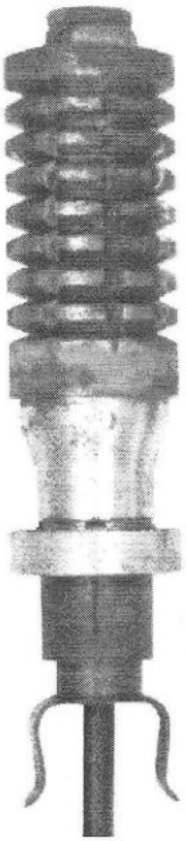
This model is identical to the Mk. I but has a 7-inch wooden handle with four streamers, 16 inches long.

Variants of No. 2 Grenade:

There were other attachments for use with this grenade. The original grenades destined for Mexico were manufactured as a rifle grenade. In this case the standard head was mounted on a rod for firing from 7mm rifles. On the 7mm pattern, the bottom piece where the rod screws in is solid. The grenades were also modified for firing from the SMLE with the addition of a clip for the nosepiece. There are grenades with the bodies marked "8mm" and "8mm B" commonly found as No. 2 grenades, presumably these were initially destined for the French and Belgian Armies. On these versions, the bottom piece where the rod screws into incorporates a muzzle clutch.

As well there was a tail attachment consisting of an eye bolt with a rope tail attached. The last few inches of the rope is frayed to make a tail. This allowed the use of the grenade without the need of a handle, the rope tail ensuring the grenade lands head first. The rope tail model was designed to meet a Royal Flying Corps requirement. They were supplied to the RFC in small numbers, approximately 5600, and were in use during 1914 and 1915.

Hales No. 3 Grenade "Brazilian Pattern"



Hales No. 3
Photo - Norman Bonney

This grenade, designed by Marten Hale, was designed for use as a hand or rifle grenade. This grenade was known as the "Brazilian Pattern Hales Grenade". It was being made by Hales for the Brazilian government but the 2000 in stock were requisitioned by the War Office in August 1914. It was then modified for use with the S.M.L.E. by the addition of a spring clip. It was used in the early stages of the First World War until overtaken by the officially designated No. 3 Mk. I grenade.

The main body is steel and is segmented on the outside. The top is closed by a brass closing plug threaded to match internal threading in the top of the body. The base is closed by an aluminum base piece that is centrally bored. Attached to the bottom of the aluminum base is a brass section that is threaded at the bottom to accept a rifle launching rod or rope tail. A central tube runs from the aluminum base to the top closing plug. A needle pellet is contained in the central bore of the base piece and is retained in place by two retaining pins. The retaining pins are inserted in two holes in the base piece that connect with the central bore. The wind vane is screwed up over the holes retaining the pins in place. Below the wind vanes is a releasing socket held in place by a safety pin. A creep spring is also contained in the central tube. The detonator screws into the top closing plug with the detonator extending down into the central tube on top of the creep spring. The detonator consists of a brass detonator holder containing a detonator and percussion cap at its lower end. Early versions had a "Rifle Clutch" included in the brass portion at the bottom of the body which engaged the protruding muzzle of the rifle, later versions were modified to have a spring clip as found on the later styles to engage the nose piece of the SMLE rifle. When the grenade is to be used, the launching rod is placed in the muzzle of the rifle and pushed down until it is fully home. The safety pin is then removed and the rifle fired using a special launching cartridge. When the rifle is fired the releasing socket drops back due to the setback caused by the firing. This frees the wind vane to rotate and screw down by force of the air passing through the vanes as the grenade travels through the air. When the wind vane screws down it releases the retaining pins which then fall out and release the needle pellet. When the grenade hits, the needle pellet is forced forward, overcoming the resistance of the creep spring and strikes the percussion cap. The percussion cap causes the detonator to explode and thus ignite the main explosive filler. For use by hand, a rope tail replaced the launching rod. In this case, the safety pin was pulled out and the releasing socket pulled back by hand, then the grenade was thrown and would act as normal, detonating on impact.

Grenade, .303 Rifle, No. 3

These grenades were originally known as the "J" Pattern Military grenade. The initial introduction of the series was on 15 Feb. 1915 with the modifications being introduced through the First World War. The entire series was declared obsolete on 11 December 1922 although the grenades had actually been out of service for a number of years prior to that.

The "Grenade, .303 inch, Short Rifle, No. 3 Mk. II" was issued both for land and naval use. The body of the grenade is a steel cylinder with deep segmenting grooves both vertically and horizontally on the outside of the body. The interior of the body is lacquered. A brass plug with a threaded central hole closes the upper end of the body. There is a recess around the central hole on the interior portion of the plug to retain the central tube.

No. 3 Mk.II
Photo - F.L.Dragon

The central tube runs from the base piece to the closing plug and is supported by recesses in both. There are collars soldered to the tube, which in conjunction with India rubber washers form a

hermetic seal to the joints between the base piece and closing plug. The base piece is made of brass with an external shape designed to give good airflow behind the body. The base piece is centrally bored to form a continuation of the central tube. There is an externally threaded portion just above the cylindrical portion at the rear. Two countersunk holes are positioned just in front of the threaded portion. A needle pellet (striker) is contained within the base piece central passage and is retained in place by two retaining bolts in the countersunk holes. A wind vane is screwed onto the threaded portion and far enough up so it covers the retaining bolts holding them into position. A releasing socket is then fitted over the cylindrical portion of the base piece below the wind vane. The phosphor-bronze safety pin then fits through the releasing socket into a groove cut into the base piece. A base plug is then screwed into the base piece sealing it. A spring clip to fit over the nosepiece of the SMLE is attached to the base plug by two small bolts and the 10-inch rod then screws into the base plug.

The needle pellet consists of a brass body with a cutout centre and tapered end. A steel needle is mounted centrally on the tapered end. There is a groove cut into the pellet about half way up on the taper. Grooves are cut longitudinally along the surface of the pellet to allow free airflow and prevent any checking of movement due to air pressure. A brass creep spring is snapped into the groove cut into the taper of the pellet.

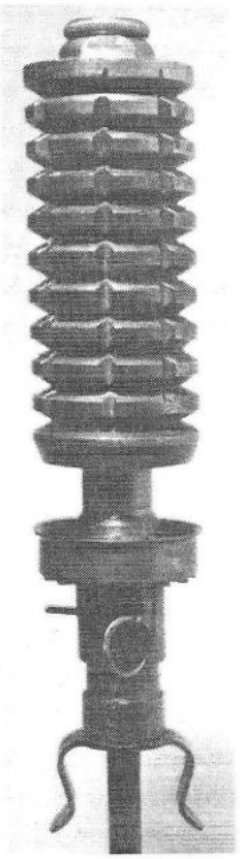
The wind vane is formed of brass with inclined vanes. A brass ring with an outwardly turned rim strengthens the vanes on the outside. The body is internally threaded to match the threads on the base piece. A stop is formed by a cutaway in the projecting flange. The stop engages a pin on the base piece that prevents further forward movement of the wind vane.

The releasing socket is a cylindrical brass collar slotted at the front. There is an internal flange, which, in conjunction with a rib on the base piece form a type of clutch holding the socket in position. A pin on the rear face of the wind vane enters one of the slots in the releasing socket, preventing the vane from rotating while the socket is in position.

The grenade is filled from the top end with Amatol 80/20 or Ammonal. The filling is stemmed in then covered by a paper disc and finally a layer of beeswax composition or paraffin wax. This grenade is issued with the "Detonator, rifle grenade, Mk. I" with "B" filling or the "Detonator, rifle grenades, Mk. II. The grenade is issued unprimed with the hole in the body plug sealed by an ebonite shipping plug. The grenade is prepared for use by removing the ebonite plug and turning the grenade upside down to determine if the needle pellet is being held in position by the retaining bolts. If the grenade passes inspection the detonator is inserted and screwed down. The grenade is then ready for use.

When the grenade is fired the releasing socket sets back and releases the wind vane. The flow of air against the blades of the vane causes it to rotate, screwing it back along the base piece and release the retaining bolts. Further rotation of the vane causes it to jam up against the releasing socket. With the vane jammed up against the socket, airflow through the vanes then cause the grenade to rotate and allow the retaining bolts to fall free. The needle pellet is then held off the detonator by the creep spring. Upon impact, the needle pellet overcomes the resistance of the creep spring and the needle hits the primer and ignites the detonator. The firing of the detonator sets off the main bursting charge. If the retaining bolts fail to fall out while the grenade is traveling, the forward movement of the needle pellet will force them out because of the curved shape of the cutout and the rounded ends of the bolts.

The grenades are painted yellow and have a red filling ring painted around the body when loaded. In the first issues of the grenade the red ring was painted around the bottom end and in later issues at the top end. Fillings are also designated by a coloured band. A green band denotes a filling of Trotyl or Amatol and a pink band for Ammonal or Tonite.



No.3 Mk.I

Grenade, .303 inch rifle, No. 3 Mk. I[N]

Originally issued for both Land and Naval use, it was restricted to Naval use only with the introduction of other grenades. It has a different contour to the base piece that does not have an efficient airflow. The ridge on the base piece to hold the releasing socket is different. The central tube does not have collars. The filling is Trotyl pellets and the grenade uses "Detonator, Rifle grenades, Mk. I" with the "A" filling. Markings are a red filling ring at the top of the body and a green band around the middle of the body.

Grenade, .303 inch rifle, No. 3 Mk. 1*[L]

TYPE- Fragmentation
WEIGHT- 1 lb. 5 oz.
HEIGHT- 6.25 in. w/o rod
DIAMETER- 1.5 in.
IGNITER- Percussion/Impact
FILLING- 2 oz 2.5 dr.

This is a conversion of the No. 3 Mk. I to land service use. The conversion simply involved removing the spring clip.

Markings are a red filling ring at the top of the body and a green band around the middle of the body.

Grenade, .303 inch rifle, No. 3 Mk. II[C]

TYPE- Fragmentation
WEIGHT- 1 lb. 5 oz.
HEIGHT- 6.25 in. w/o rod
DIAMETER- 1.5 in.
IGNITER- Percussion/Impact
FILLING- 2 oz 2.5 dr.

As described in the main text. Markings are body painted yellow, .25 inch red filling ring at the top of the body and a .5 inch band around the middle of the body denoting the filling, pink for Ammonal and green for Amatol.

Grenade, .303 inch rifle, No. 3 Mk. II*[L]

This is a conversion of the No. 3 Mk. II to land service use. The conversion involved removing the spring clip. The pin at the rear of the wind vane is also removed. Markings consist of a red filling ring at the top of the body and a green band around the middle of the body. Stamped markings will also be found on the windvane and top cap.

Grenade, .303 inch rifle, No. 3 Mk. III[L]

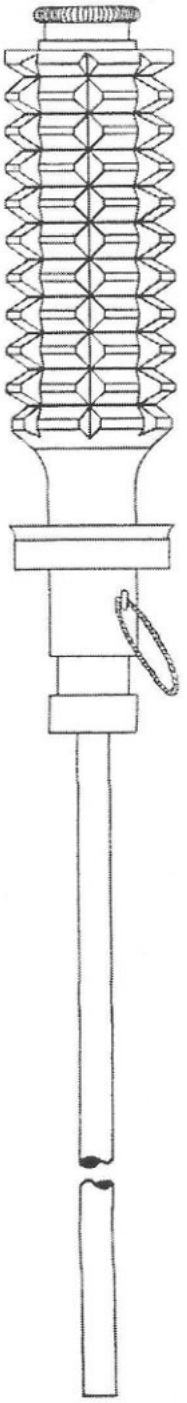
TYPE- Fragmentation
WEIGHT- 1 lb. 5 oz.
HEIGHT- 6.25 in. w/o rod
DIAMETER- 1.5 in.
IGNITER- Percussion/Impact
FILLING- 2 oz 2.5 dr.

This is the same as the No. 3 Mk. II* but is not a conversion. This is a new manufacture of the grenade to the specifications of the Mk. II*. Markings are a red filling ring at the top of the body and a green band around the middle of the body.

Grenade, .303 inch rifle, No. 3A Mk. I[C]

TYPE- Fragmentation
WEIGHT- 1 lb. 5 oz.
HEIGHT- 6.25 in. w/o rod
DIAMETER- 1.5 in.
IGNITER- Percussion/Impact
FILLING- 2 oz 2.5 dr.

This grenade was issued for both Land and Naval service. The grenade construction is exactly the same as the No. 3 Mk. II with the exception of the central tube that has no collars. The grenade uses a different filling that does not require the collars. Fillings include Trotyl or Amatol 40/60 cast in paper containers for Naval service. For land service a filling of Tonite pellets coated with paraffin wax was used. The grenade has a .25 inch red filling ring around the top of the body.



No. 3A Mk. II

Grenade, .303 inch rifle, No. 3A Mk. I*[L]

TYPE- Fragmentation
WEIGHT- 1 lb. 5 oz.
HEIGHT- 6.25 in. w/o rod
DIAMETER- 1.5 in.
IGNITER- Percussion/Impact
FILLING- 4 oz.

This is a conversion of the No. 3A Mk. I to a land service grenade by the removal of the spring clip. Fillings include Tonite pellets or stemmed Ammonal, or Amatol 80/20 in a paper container. The grenade has a .25 inch red filling ring around the top of the body. It may also have a coloured band around the middle denoting the filling, pink band for Ammonal and green for Amatol 80/20.

Grenade, .303 inch rifle, No. 3A Mk. II[L]

TYPE- Fragmentation
WEIGHT- 1 lb. 5 oz.
HEIGHT- 6.25 in. w/o rod
DIAMETER- 1.5 in.
IGNITER- Percussion/Impact
FILLING- 4 oz.

This version is similar to the No.3A Mk. I* but is of new construction, not a conversion. There are a few differences as follows: The pin at the rear of the wind vane is omitted. The face of the needle pellet, where it engages the retaining bolts is of a flat more sloping section. This ensures they will be ejected when the pellet moves forward on impact. The grenade has a .25 inch red filling ring around the top of the body. It may also have a coloured band around the middle denoting the filling, pink band for Ammonal and green for Amatol 80/20.

Grenade, .303 inch rifle, No. 3 Dummy

TYPE- Drill
WEIGHT- 1 lb. 5 oz.
HEIGHT- 6.25 in. w/o rod
DIAMETER- 1.5 in.

These grenades are made in the same manner as the live grenades but have no explosive content. The body is painted white to distinguish them as drill grenades. Dummy detonator holders containing dummy detonators were also supplied. These are distinguished from live ones by not being closed at the bottom.

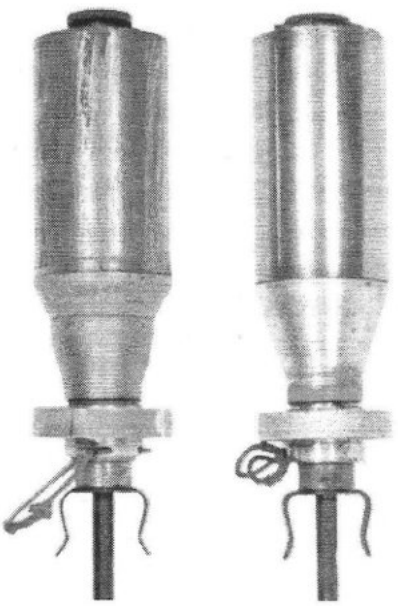
Attachments for the No. 3 grenade

Also available for this grenade was a rope tail attachment. The rod could be replaced by the rope tail and the grenade used in a manner similar to a normal hand grenade. The rope tail consisted of an eyebolt, threaded to match the rod and a rope tail. The end of the rope tail was frayed to provide a better drag. If used with the rope tail, the releasing socket would need to be pulled back by hand in order for the grenade to function properly. Also available was the "Tail piece, No. 3 rifle grenade, Mk. I [N]". This was a tailpiece designed to replace the launching rod and convert the grenade into an aerial bomb for use by the Naval service. It consists of a threaded socket with three tin fins attached. In transit the grenades are protected by a tin cylinder with a hole in the base for the launching rod and a screw cap on the other. The protective cylinder is designated "Cylinder, protecting, Nos. 3 and 3A rifle grenades, Mk. I".

Grenade, .303 Rifle, No. 4 Mk. I[N]

TYPE- Offensive
WEIGHT- 1 lb. 6 oz.
HEIGHT- 6.25 in. w/o rod
DIAMETER- 1.875 in.
IGNITER- Percussion/Impact
FILLING- 6 oz. 15 dr.

Initially introduced as the "Naval Aircraft Grenade, Mk. I" the No. 4 grenade was officially introduced for service on 16 Feb 1915 and officially declared obsolete on 19 Oct. 1918. The grenade was issued for Naval service only and was restricted to firing from rifles equipped with a safety spike. The No. 4 Mk. 1 grenade differs slightly from the Naval Aircraft Grenade Mk. I. The most noticeable difference is on the taper from the body to the base; on the Naval grenade it appears to have a "step", on the No. 4 Mk. I it is a straight taper.

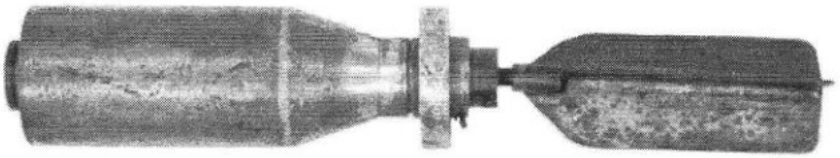


Hales No. 4 — No. 4 Mk. I

Photos - Norman Bonney

The body consists of a smooth, cylindrical, brass casing with a brass closing plug at the top end and an aluminum base piece. A central tube is supported between the base piece and closing plug. The base piece is tapered from the join with the body down to a threaded portion on the bottom. It is centrally bored to form a deep seat and short extension for the central tube. Two holes are drilled from the sides into the central tube just in front of the threads. Two retaining bolts fit into these holes. The wind vane is screwed onto the threads and up far enough so that it holds the retaining bolts in place. A base plug is threaded to screw into the base piece and seal the grenade. A spring clip is attached to the base plug and the 10-inch rod screws into a threaded hole in the bottom of the plug. A phosphor-bronze safety pin fits through the rear portion of the vane and into a groove in the base piece preventing the vane from moving. The needle pellet (striker) is turned down so there is a thinner section in the centre

with a groove formed near the rear of the pellet. Two guides are formed on it, one near the head and one at the rear. The striker needle is mounted in the front. A row of ball bearings fit into the groove formed on the pellet supporting the rear of the pellet.



No. 4 Mk.I fitted with "Tailpiece, No. 3 Rifle Grenade Mk. I"
Photo - Norman Bonney

The filling of the grenade is Trotyl and it is issued with "Detonator, rifle grenade, Mk. I". The detonator screws into a socket in the closing plug and is prevented from screwing out by a spring clip.

The body of the grenade is unpainted with a red filling ring at the very top of the body. A green band is painted around the centre to indicate a filling of Trotyl. The designation, a manufacturers mark and the date of manufacture are stamped into the top of the closing plug.

The grenade is issued unprimed with the socket closed in transit by a plug. The detonator must be inserted prior to use and the grenade fitted to a rifle equipped with a safety spike. The grenade is mounted on the rifle with the safety spike passing through the vane preventing its rotation.

When the rifle is fired, the grenade is propelled off the rifle and safety spike. The vane is then free to rotate by the flow of air through the vane. The vane screws back on the threads and releases the retaining bolts. On impact, the needle pellet overcomes the resistance of the creep spring and strikes the primer. The primer flashes into the detonator causing it to explode and in turn set off the main bursting charge of Trotyl.

These grenades were used by the Naval Aviation services against balloons. Because the target was balloon fabric, the mechanism had to be very fast in order to explode when it came into contact with the fabric. The roll of ball bearing "races" on the striker pellet greatly contributed to the speed of the mechanism. Due to the short ranges involved, the arming also had to be very fast. The absence of a releasing socket allowed this. A safety spike was required to prevent the grenade arming immediately after removing the safety pin from the force of wind around the aircraft passing through the vane. The grenade was later relegated to a bombing role, fitted with a "Tail piece, No 3 Rifle Grenade, Mk. I [N]".

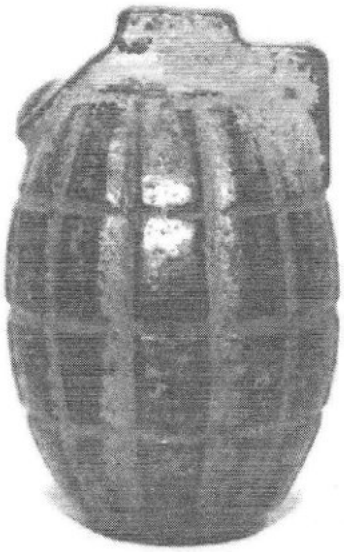
Grenade, Hand, No. 5 Mk. I

TYPE- Fragmentation
WEIGHT- 1 lb. 7 oz.
HEIGHT- 3.75 in.
DIAMETER- 2 5/16 in.
IGNITER- Time delay
FUSE DELAY- 5 sec.
FILLING- 2 oz. 2 dr.

The "Grenade, Hand, No. 5" was invented, or more correctly, improved from the "Roland Grenade" during the period between December 1914 and February 1915 by Sir William Mills (1856-1932). The first issue of the grenades to the British Expeditionary Force was a shipment of 48 grenades on 15th March 1915. This first shipment was a trial lot to see how the grenades performed in the field. The first formal order of 50000 grenades was offered to Mills on the 27th March 1915 but the order was not signed off by both sides until April 27th, 1915. The No. 5 Mk. I began to come off the production lines in reasonable quantity in about May 1915. By the time of Loos (September 1915) the Mills had begun to arrive at the front. At that time there were 11,484 on hand, mainly issued to the Guards Division. The No. 5 or "Mills Bomb" was to become the best known of all British grenades, leading over a period of years to the development of the No. 23 and No. 36 grenades. The No. 5 was officially adopted for service on 20 May 1915 and finally declared obsolete on 6 May 1920. The final version, No. 36M Mk. I, however, served well into the 1980's and may still be in use in some countries to this day.

No 5 Mk. I

The grenade consists of an oval shaped cast iron body with external segmenting



No. 5 Throwing Dummy

grooves. The bottom is open and threaded, with a filling hole high up on the side, and a hole through the top. There are two stepped shoulders cast on the top flanking the top hole. The body is lacquered both inside and out. A centrepiece fits into the bottom hole and screws into the threads in the body. The centrepiece may be formed in one piece of aluminum or built up of a brass cup with brass or copper tubes sweated onto it. The cup screws into the threads in the body and provides a chamber for the cap holder. The stalk of the centrepiece provides a central passage for the striker and striker spring and has a side chamber for the detonator. The central passage lines up with the top hole on the body. When the centrepiece is screwed in, it is screwed fully up leaving a threaded portion at the bottom of the grenade. A base plug is then screwed into the remaining threads. The base plug may be of many types, depending on the manufacturer. It may be found as an aluminum or zinc alloy casting, or it may be made of brass and be stamped, cast, or pressed. Most markings are found on the base plug.

The striker and striker spring fit up through the centrepiece before the base plug is screwed on. The striker is a steel spindle with a turned groove at the top to form a catch similar to the head of a nail. It has a head at the bottom end that forms a support for the spring and has two striker points formed on the bottom. Later issues of the grenade will be found with a groove in the striker head to allow gases from the burning fuze to escape. The older strikers are sometimes modified by cutting the groove in. The striker lever is formed of a strip of steel bent to conform to the contour of the body and having flanges on the top end. The flanges may extend the whole length of the lever tapering down to the end or may be formed only at the top, again depending on the manufacturer. The flanges are turned up forming a channel to strengthen the lever. Holes through the flanges are fitted with a steel pin that extends out past the flanges to form a pivot. The striker lever fits between the shoulders on the body with the pivot fitting in grooves in the shoulders. The end of the lever engages the top of the striker holding it up with the spring compressed. A safety pin fits through holes in the lower step of the shoulders and through corresponding holes in the striker lever or over the top of the lever holding it down in the safe position.

The detonator assembly consists of a cap holder, length of fuze, .22 rim fire cap, and detonator. The rim fire cap is held in the cap holder by expanding its inner end. The cap holder may be made of brass, aluminum, or zinc alloy. It has a section designed to fit into the bottom end of the central tube and a rim to prevent it being inserted too far. The bottom is slotted to receive the fuze. The fuze may be "Fuze, Safety, No. 11 Mk. 1 or Bickfords No. 14. It is attached to the cap holder and bent around so that the detonator might fit into its chamber. The detonator is crimped onto the opposite end of the fuze. A No. 6 detonator is used. There were several detonator assemblies used with the No. 5 grenade, "Detonator, Grenade, Hand, No. 5 Mk. I", "Detonator, Grenade, Hand, No. 5 Mk. II", "Detonator, Grenade, Hand, No. 5 Mk. III", or "Detonator, No. 23 Mk. I". These detonators differ only in minor details: the Mk. II differs from the Mk. I by having a central vent in the cap to provide a gas escape and the Mk. III has a taper to the inner end of the cap holder.

The filling may be Ammonal, Amatol 80/20, Sabulite, Bellite, Baratol, or Cilferite. It is stemmed in through the filling hole that is then closed by a filling plug. The filling plug may be made of brass, aluminum, or zinc alloy.

The grenades all have the normal red filling ring painted around the top. In the first issues of grenades coloured bands below the red filling ring denoted the fillings. A green band indicates a filling of Amatol 80/20 or 83/17 and a pink band indicates Ammonal Alumatol, or Bellite.

The grenades are shipped unfuzed with the detonator assemblies in a tin cylinder within the same packing box. Each box contains 12 grenades, 12 detonator assemblies, one key for tightening the base plug, and one haversack with 12 pockets.

To prepare the grenade for use, it must be primed. To prime the grenade, remove the base plug, insert the detonator assembly with the detonator in the side chamber and the cap holder in the central tube. Then replace the detonator and tighten it down with the key. To throw the grenade, grasp it so the lever is held down, remove the safety pin, and throw the grenade. When the grenade leaves the hand, the lever flies off releasing the striker. Under pressure of the spring the striker is forced down onto the cap which fires and ignites the fuze. The fuze burns for 5 seconds and ignites the detonator. The resulting detonation of the detonator sets off the bursting charge.

These grenades were manufactured by many factories. See the markings section to determine exactly what individual markings on the grenades mean.

Grenade, Hand, Practice, No. 5 Mk. I

Along with the live versions, there were instructional grenades manufactured. Some were made exactly the same as the live version but with a filling of sand and with special markings. The official marking was a white band stenciled in black with the word "Practice". There were also some produced which were "Electro-Zinced" and had the base plug marked "Dummy for Throwing Practice". They may also be found with the body painted entirely white. This type could be used to teach the workings of the grenade as well as for throwing practice. Dummy igniter sets were also supplied. These can be distinguished from a live igniter by a hole in the end of the detonator approximately one third the diameter of the detonator, in addition the cap has no central hole.

There are many types produced for throwing practice only. These are simply single piece castings made to resemble the outline of the grenade and having approximately the same weight as a live grenade. The may be found painted black, red with a yellow top, white, or unpainted. There are simply too many to detail in this book.

Grenade, Hand No. 5 Mk. II

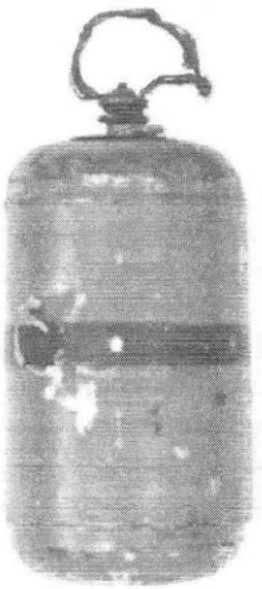
It is believed that this designation was issued to the No. 5 grenade to cover off the modification to the striker. Strikers were modified by cutting a slot through the head to allow gases to escape through the top hole of the grenade. The designation was promulgated in a paper and the "Specification for Manufacture" adjusted, but it never appeared in the "List of Changes". Perhaps the No. 23 Mk. I was issued before it could be put into effect.

Grenade, Hand, No. 6 Mk. I

TYPE- Offensive
WEIGHT- 1 lb.
HEIGHT- 4.0 in.
DIAMETER- 2.25 in.
FUSE DELAY- 5 sec.
IGNITER- Friction
FILLING- 12 oz. or 8oz.

This is one of the "Emergency Pattern" grenades produced in Britain in response to the severe shortages of grenades at the front. Originally introduced as the "RL Light Friction Pattern" it was later redesignated the No. 6 Mk. I. It was officially introduced for service on 20 May 1915 and declared obsolete on 29 July 1920; several years after use had ceased.

The body resembles a cylindrical tin with rounded corners. The central body is made of tinned steel plate rolled and soldered to form a cylinder. The top and base are slightly smaller in diameter than the cylinder and are soldered into it to form the body. The top has a central hole to accept the igniter mechanism with two, headed studs, riveted on either side of the hole. When the grenade is filled a wooden block is placed over the filling before the base is soldered on.



No. 6 Mk. I
Photo - Norman Bonney

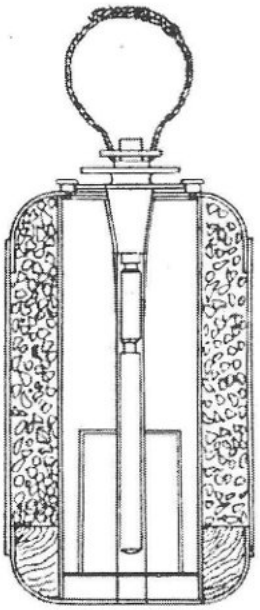
The "Igniter No. 6 or 7 Hand Grenade" consists of a holder containing a friction compound. A whipcord or stranded copper wire becket (stranded copper wire is normal) is attached to a friction bar fitted in the upper part of the holder and embedded in the friction compound. The holder is attached to a short piece of safety fuze that is crimped into a No. 8 Mk. VII detonator. A flange, soldered to the holder, is provided with entering slots and retaining springs. The flange engages the studs mounted on the body of the grenade and secures the igniter to the grenade. When the becket is pulled, the friction bar is pulled out of the friction compound causing it to ignite. The friction compound ignites the safety fuze that burns for 5 seconds. The fuze causes the detonator to explode and set off the main bursting charge.

The filling may be stemmed Amatol 80/20 or cast Trotyl. The grenade is yellow overall and marked with a red filling ring around the top and a green band around the centre of the body. If filled with Amatol a fraction is stenciled above the green band. The designation, a manufacturers mark, and the date of filling are stenciled below the green band. Some are

stenciled "LIGHT" in lieu of the designation. The grenades were issued unfuzed with a wooden plug in the igniter pocket and covered with a paper mache cap. A case of grenades contained 40 grenade bodies, 5 tin boxes, each containing 10 igniters, and 4 haversacks.

The grenade must be primed prior to being used. To prime the grenade, remove the wooden plug from the igniter pocket in the top of the grenade. Insert an igniter and engage the entering slots with the studs. The grenade is then primed and ready for use. To throw the grenade, hold firmly in one hand and pull the becket with the other hand, immediately throw the grenade.

Grenade, Hand, No. 7 Mk. I



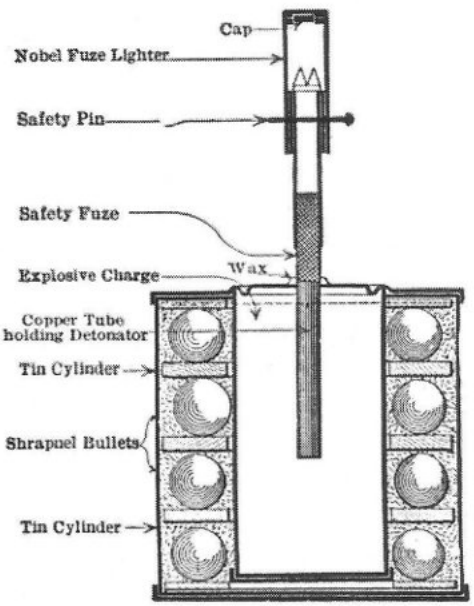
TYPE- Fragmentation
WEIGHT- 2 lb.
HEIGHT- 4.0 in.
DIAMETER- 2.25 in.
IGNITER- Friction
FUSE DELAY- 5 sec.

This grenade was originally issued as the "R.L. Heavy Friction Pattern". It was another of the emergency pattern grenades produced in Britain in response to the shortage of grenades in France. The official date of introduction is 20 May 1915 and it was declared obsolete on 29 July 1920.

It is very similar in looks to the No. 6 Mk. I but has some construction differences. The central body is made of tinned steel plate rolled and soldered to form a cylinder. The top and base are slightly smaller in diameter than the cylinder and are soldered into it to form the body. The top has a central hole to accept the igniter mechanism with two headed studs riveted on either side of the hole. The differences are in the internal arrangements. The No. 7 has an inner cylinder to hold the bursting charge. The space between the inner cylinder and the outer casing is filled with scrap steel to provide fragmentation effects. When the grenade is filled a wooden block is placed over the filling before the base is soldered on.

The filling is Trotyl or Amatol 80/20 and the grenade is provided with an exploder of C.E. The grenade is yellow overall, markings on the grenade include a red filling ring around the top and a green band around the centre of the body. If filled with Amatol the fraction is stenciled above the green band and the designation, filling station mark and date of filling are stenciled below the band. Some are stenciled "HEAVY" in lieu of the designation.

The igniter is the same as used with the No. 6 Mk. I, it consists of a holder containing a friction compound. A stranded copper wire or possibly a whipcord becket is attached to a friction bar fitted in the upper part of the holder and embedded in the friction compound. The holder is attached to a short piece of safety fuze that is crimped into a No. 8 Mk. VII detonator. A flange, soldered to the holder, is provided with entering slots and retaining springs. The flange engages the studs mounted on the body of the grenade and secures the igniter to the grenade. When the becket is pulled, the friction bar is pulled out of the friction compound causing it to ignite. The friction compound ignites the safety fuze that burns for 5 seconds. The fuze causes the detonator to explode and set off the exploder and in turn the main bursting charge.



Grenade, Hand, No. 8 Mk. I

TYPE- Fragmentation
WEIGHT- 1 lb. 7 oz.
HEIGHT- 3.0 in.
DIAMETER- 2.875 in.
IGNITER- Nobel Lighter
FUSE DELAY- 5 sec.
FILLING- 7 oz.

Officially introduced on 20 May 1915, this was an "Emergency Pattern" grenade modeled after the improvised "Jam Pot" grenades being made at the front. The grenade was initially called the "Double Cylinder Light Pattern Grenade" later being redesignated as the No. 8 Mk. I. It was officially declared obsolete on 29 July 1920. The main if not the only manufacturer of these grenades was "Roburite and Ammonal Ltd." of London.

The body is made up of two soldered tin cylinders, the inner cylinder, containing the filling, is 2.75 inches high and 1.5 inches diameter. The

inner cylinder is placed inside an outer cylinder 3.25 inches high and 3 inches diameter. The space between the two cylinders is filled with steel shrapnel balls. It may be in two different configurations: The first configuration has five thin wooden spacers, one each at top and bottom and three more separating levels of shrapnel balls between the other two. It is believed that this is the original design but was modified to have two spacers about .5 inch wide at top and bottom with the balls in between the spacers embedded in resin. The second configuration was likely made to speed production of the grenades and is the most common. The top is closed by a tin lid; the inner container is closed by a tin plug with a copper detonator tube soldered into the centre. Two copper wires are soldered to the top to retain the igniter.

The igniter consists of a Nobel fuze lighter, 1.75 inches of safety fuze, and a No. 8 Mk. VII detonator. It is assembled by inserting the fuze into the lighter leaving about 7/8" of the fuze exposed. The detonator is then crimped onto the open end of the fuze. The joints are waxed to provide moisture protection. When the grenade is primed the igniter assembly must be wired to the grenade and the joint where the igniter enters the body covered in wax. If a fuze lighter is not available the grenade can be used with just a detonator and fuze and the fuze ignited by a portfire or other suitable method.

The Nobel lighter consists of two cardboard tubes, one fitting over the other. The outer tube is closed at the top end and acts as a cap. A small brass cap containing friction compound is fixed in the top of the cap. A two-pointed brass striker is attached to the top of the inner tube. A safety pin passes through both tubes holding the outer tube in a position where the cap containing the friction compound is held approximately .25 inch away from the striker. The open end of the inner tube has a copper band attached to it so that when the fuze is inserted the copper band can be crimped to retain it in place. A narrow band of tape around the joint of the two tubes provides a moisture barrier.

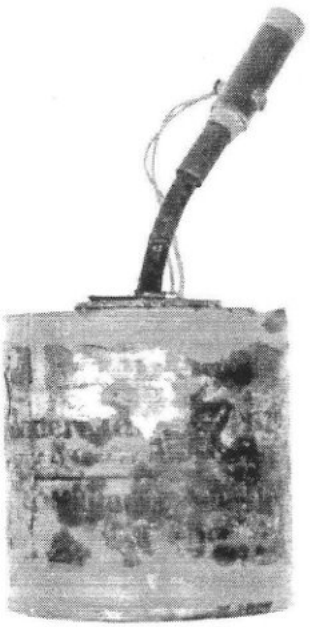
The only marking normally found on these grenades was a pasted paper label. The label gives the designation, manufacturers name or mark, and the date of manufacture. The official marking diagrams show that the grenade should be marked with a red filling ring around the top of the body and a pink band around the centre of the body. The designation should be stamped into the top cover. These grenades were packed in wooden boxes containing 25 grenades. The igniters were issued separately.

For use, the grenade is grasped in one hand with the thumb and forefinger gripping the bottom of the inner tube on the igniter. The tape is then pulled off and the safety pin withdrawn. With the other hand press down on the outer tube and twist slightly. This scratches the points against the friction compound producing a flash. The flash travels down the tube and lights the fuze. The grenade must be thrown immediately as the fuze gives a delay of five seconds.

Grenade, Hand, No. 9 Mk. I

TYPE- Fragmentation
WEIGHT- 2 lb.
HEIGHT- 3.0 in.
DIAMETER- 2.875 in.
IGNITER- Nobels lighter
FUSE DELAY- 5 sec.
FILLING- 7 oz.

Originally introduced for service as the "Double Cylinder Heavy Pattern Grenade" on 20 May 1915 this grenade was later renamed the No. 9 Mk. I. Although it was only used for a short time it was not declared obsolete until 29 July 1920. The main manufacturer of these grenades was "Roburite and Ammonal Ltd." of London. There were three contracts let to Roburite and Ammonal Ltd. for the production of "Double Cylinder Grenades". The contract documents do not differentiate between the "Light" or "Heavy" Patterns, so the totals here are combined between the No. 8 and No. 9 grenades. The first was let on 7 January 1915 calling for 8000 grenades, 4000 to be delivered by 11 January 1915 and the remainder by 18 January. A total of 6700 were delivered from this contract at 4 shillings each. The second contract was let on 31 February 1915 for a total of 71000 grenades. 60000 were to be delivered by 3 March 1915 and the remainder by 10 March. Total delivered is unknown. The third contract was let on 31 March 1915 for a total of 29900 grenades at 3 shillings each. The first 8000 were to be ready on 2 April 1915 with a further 6000 per week after that. The contract was to be completed on 30 April. The total delivered is uncertain.



No. 9 Mk. I
Photo - Norman Bonney

The grenade is in effect a No. 8 Mk. I with some minor changes. In the No. 9 the wooden spacers are eliminated and the space between the two cylinders is completely

filled with shrapnel balls. The body is made up of two soldered tin cylinders, the inner cylinder, containing the filling, is 2.75 inches high and 1.5 inches diameter. The inner cylinder is placed inside an outer cylinder 3.25 inches high and 3 inches diameter. The space between the two cylinders is filled with steel shrapnel balls embedded in resin. The top is closed by a tin lid; the inner container is closed by a tin plug with a copper detonator tube soldered into the centre. Two copper wires are soldered to the top near the detonator pocket to bind the igniter to the grenade.

The igniter consists of a Nobel fuze lighter, 1.75 inches of safety fuze, and a No. 8 Mk. VII detonator. It is assembled by inserting the fuze into the lighter leaving about 7/8" of the fuze exposed. The detonator is then crimped onto the open end of the fuze. The joints are waxed to provide moisture protection. When the grenade is primed the igniter assembly must be wired to the grenade and the joint where the igniter enters the body covered in wax. If the Nobels fuze lighter is unavailable the grenade can be used with the fuze and detonator. The fuze can be ignited by a portfire or some other suitable method.

The grenades were normally marked with a pasted paper label on the body. The label gives the designation, manufacturer, date of manufacture and "DOUBLE CYLINDER". The official marking diagrams show that the grenade should be marked with a red filling ring around the top of the body and a pink band around the centre of the body. The designation should be stamped into the top cover.

The Nobel lighter consists of two cardboard tubes, one fitting over the other. The outer tube is closed at the top end and acts as a cap. A small brass cap containing friction compound is fixed in the top of the cap. A two-pointed brass striker is attached to the top of the inner tube. A safety pin passes through both tubes holding the outer tube in a position where the cap containing the friction compound is held approximately .25 inch away from the striker. The open end of the inner tube has a copper band attached to it so that when the fuze is inserted the copper band can be crimped to retain it in place. A narrow band of tape around the joint of the two tubes provides a moisture barrier.

For use, the grenade is grasped in one hand with the thumb and forefinger gripping the bottom of the inner tube on the igniter. The tape is then pulled off and the safety pin withdrawn. With the other hand press down on the outer tube and twist slightly. This scratches the points against the friction compound producing a flash. The flash travels down the tube and lights the fuze. The grenade must be then be thrown immediately. The No. 9 grenade was really too heavy for effective throwing by hand, it may have been relegated for use with the "spring gun".

Variants of the No. 9 Grenade

It has been noted that there are also No. 9 grenades filled with thick steel discs instead of shrapnel balls. In this case the paper label on the grenade is marked "Double Cylinder, Improved Pattern". Contract documents refer to a contract being changed part way through the production. This may have resulted in an improvement that may have been the different type of shrapnel. It should be noted however, that this information is not confirmed.

Grenade, Rifle, No 10 Mk. I [N]

TYPE- Offensive
WEIGHT- 1 lb. 5 oz.
HEIGHT- 6.75 in. w/o rod
DIAMETER- 1.875 in.
IGNITER- Percussion/Impact
FILLING- 6 oz. 15 dr.

Introduced as the "Naval Long Rifle Pattern" this grenade was for use with the Naval Pattern Long Lee Enfield rifle. It is essentially a No. 4 Mk. I with some minor modifications and the removal of the spring clip. The rod is 15 inches long as opposed to the 10 inch rod of the No. 4. The filling is the same as the No. 4 Mk. I, Trotyl.

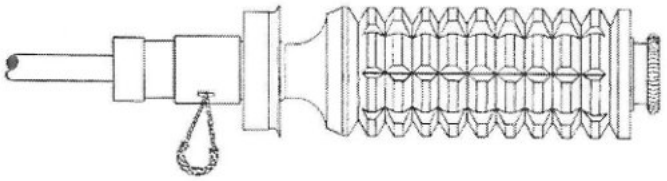
No. 10 Mk. I
Photo - Norman Bonney

Grenade, Rifle, No. 11 Mk. I

This grenade is a modification of the No. 3. As such, the description of the No. 3 is the same for this grenade. The differences are this one is designed for use with the Long Lee Enfield and is fitted with a 15" rod and has the spring clip removed. The grenade used a filling of Trotyl. Markings are a red band around the top of the body and a green band around the centre of the body.

TYPE- Fragmentation
WEIGHT- 1 lb. 5 oz. w/o rod
LENGTH- 6.25 in.
DIAMETER- 1.5 in.
IGNITER- Percussion/Impact
FILLING- 2 oz. 2.5 dr.

The designation, manufacturers mark and date will be marked on the top cap of the grenade.

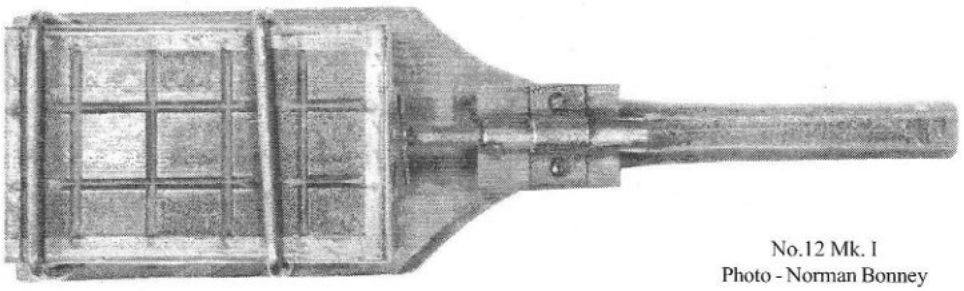


Grenade, Hand, No. 12 Mk. I

TYPE- Fragmentation
WEIGHT- 3 - 3.5 lb.
LENGTH- 13.5 in.
HEIGHT- 2.75 in.
WIDTH- 3.75 in.
IGNITER- Percussion
FUSE DELAY- 5 sec.
FILLING- 1 lb.

This grenade was commonly known as the "Hairbrush" or "Box Pattern" grenade. It was officially introduced for service as one of the "Emergency Patterns" on 20 May 1915 and declared obsolete on 29 July 1920.

The grenade consists of a wooden back, shaped to resemble the back of a hairbrush. A tin box is attached by two clamps fitted over the box, through holes in the wooden back and secured by nuts. The filling is contained within the tin box that is then covered by a heavy steel plate. The steel plate is segmented to aid in its breaking up into fragments. A detonator holder is soldered into a hole in the box facing the handle of the grenade. A small wooden block is attached to the top end of the handle by brass screws. The igniter mechanism is then screwed to the wooden block with a small strap of sheet metal. The filling is a one pound charge of ammonal.



No.12 Mk. I
Photo - Norman Bonney

The igniter assembly is made up of an "Igniter, Safety Fuze, Percussion, Mk. I or Mk. II", a length of safety fuze, and a "Detonator, No. 8 Mk. VII". The igniter is attached to the safety fuze and the other end of the fuze crimped on to the detonator. When fitted to the grenade, the detonator is inserted into the detonator pocket and the igniter pinned to the wooden block on the handle. The fuze gives a delay of 5 seconds.

The "Igniter Safety Fuze, Percussion, Mk. I[L]" consists of a large and small brass tube attached together end to end. The larger tube contains the cap holder, striker, striker spring, closing plug, and safety pin. The cap holder is formed on or fitted to the end of the small tube and then inserted into the open end of the large tube and secured. The opposite end of the large tube is threaded to accept the closing plug. The striker has a hinged extension that fits through the closing plug. The striker and striker spring are fitted onto the closing plug and the extension turned up 90 degrees to hold the striker in the cocked position. The closing plug with striker mounted is screwed into the large tube and a safety pin inserted through holes in the tube and a matching hole in the striker head. The open end of the small tube is for the safety fuze to fit into. The fuze is held slightly back from the cap by inward turned projections punched out of the tube. The holes left in the tube provide a gas escape for the burning fuze. For use, the safety pin is removed ensuring the extension is turned up in the locked position. The extension is then turned down and released allowing the striker to fly forward and strike the cap. The grenade must be thrown immediately after releasing the striker. The "Igniter, Safety Fuze, Percussion, Mk. II [L]" differs from the Mk. I by the extension of the striker being removed and the striker lengthened slightly. The safety pin is fitted through the top end of the striker and holds the striker in the cocked position. For use, the pin is pulled out allowing the striker to fly forward and hit the cap.

The grenades are shipped in boxes containing 6 grenades. The igniters and detonators are packed separately from the

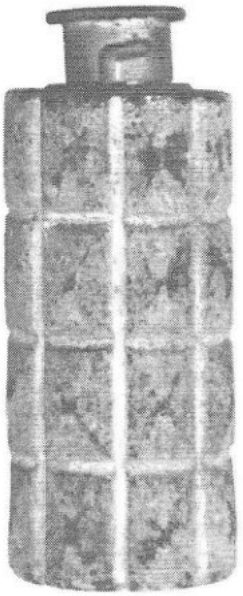
grenades. The grenade is marked by a paper label pasted onto the back of the wooden handle. The label gives the designation, manufacturer, and type of filling.

For use, the grenade is grasped in one hand by the handle, the pin is pulled out of the igniter with the other, and the grenade thrown immediately. When the pin is pulled it releases the striker that is driven forward under pressure of a spring. The striker hits the percussion cap that causes a flash that ignites the fuze. The fuze burns down to the detonator which fires and causes the main bursting charge to detonate.

Grenade, Hand, No. 13 Mk. I [L]

TYPE- Fragmentation
WEIGHT- 1 lb. 2 oz.
LENGTH- 4.0 in.
DIAMETER- 2.0 in.
IGNITER- Friction
FUSE DELAY- 5 sec.
FILLING- 4 oz.

This was one of the "emergency pattern" grenades officially introduced for service on 20 May 1915. The grenade was mainly used during 1915 while supplies of standard grenades were in short supply. It was not declared obsolete until 2 June 1922, many years after it had been out of service. According to British Army records there were 56,315 Pitcher Grenades in France on 11 Sept 1915.



No. 13 Mk. I

The body consists of a cylindrical steel outer casing with steel base attached. The outer casing is segmented to aid in the break up when the grenade is detonated. A tin cylinder containing the bursting charge of Ammonal fits into the outer casing and the space between the two is filled with either pitch or lead wool. A cavity is formed in the filling for the igniter assembly. Collars are soldered to the top of the inner cylinder to retain the igniter. The igniter is inserted into the grenade and secured by matching the cutaway flange on the igniter underneath the collar on the inner cylinder and pressing down the three small tabs. A red filling ring is painted around the top of the grenade, in addition there is a coloured ring denoting the filling, in this case the ring is pink denoting the filling of Ammonal.

The "Igniter for Nos. 13 &14 Hand Grenades, Mk. I" is formed of a cylindrical body fitted with a central tube. The top of the central tube is cut off diagonally and covered with a plate, leaving a slit. A bead of match head composition is secured below the slit. A tape coated with matchbox striker composition is passed through the slit with the coated surface in contact with the matchhead composition. The end of the tape is tucked into a pocket soldered to the outside of the central tube. The top end of the tape is secured to the cap and folded over providing a short length of tape to allow the cap to be removed safely without immediately igniting the grenade. The cap is held to the body by bayonet joints. An India rubber washer is fitted into the top of the cap providing a watertight seal for the igniter. A short length of fuze with a "Detonator, No. 8, Mk. VII" crimped onto one end is inserted into the open end of the central tube. This igniter caused numerous "prematures" and Bombers using the "Pitcher" grenades were known as members of "The Suicide Club" due to the unreliability of the igniter. The prematures were likely caused because the flash from the friction fuze could travel outside the fuze and if the detonator was not properly crimped and sealed the flash itself could fire the detonator.

The grenade must be primed prior to use. To prime the grenade; a length of fuze is cut off the small roll supplied and a detonator crimped on. It is then inserted in the grenade and the igniter slipped over the end of the fuze. The igniter is secured by matching the cutaway flange on the igniter underneath the collars on the inner cylinder and pressing down the three small tabs. The fact that the fuze was primed in the lines may well have contributed to the high number of prematures.

For use; the cap is removed from the grenade by turning the cap slightly to release the bayonet joints and then giving the cap a sharp jerk. The tape will be pulled across the surface of the match-head composition causing it to ignite and light the safety fuze. The fuze burns for four to five seconds, reaches the detonator and causes it to detonate, which in turn, sets off the main bursting charge.

These grenades were packed in wooden boxes containing 25 grenades and two tin boxes. One tin box contains 6 feet of safety fuze and 25 detonators; the other contains 25 igniters and a pair of pliers for cutting the fuze and crimping the detonators.

Grenade, Hand, No. 13 Mk. I Dummy

This grenade is identical to the live version but has no explosive content. The body is painted white to identify it as a drill grenade.

Grenade, Hand No. 14 Mk. I [L]

TYPE- Fragmentation
WEIGHT- 1 lb. 8 oz.
LENGTH- 4.0 in.
DIAMETER- 2.0 in.
IGNITER- Friction
FUSE DELAY- 5 sec.
FILLING- 4 oz.

This grenade falls into the "emergency pattern" category introduced for service during the First World War. Officially introduced on 20 May 1915 the use of this grenade was virtually over by the end of 1915. It was declared obsolete on 29 July 1920.

The body is very similar in construction and shape to the No. 13 grenade. It consists of a cylindrical outer casing made of malleable cast iron with a separate base of the same material attached. The outer casing is segmented to aid in the break up when the grenade is detonated. A tin cylinder containing the bursting charge of Ammonal fits into the outer casing with the space between the two filled with pitch. A cavity is formed in the filling for the igniter assembly. Collars soldered to the top of the inner cylinder retain the igniter assembly.

The body is marked with a red filling ring at the top and slightly lower down a pink band denoting a filling of Ammonal.

The "Igniter for Nos. 13 &14 Hand Grenades, Mk. I" is formed of a cylindrical body fitted with a central tube. The top of the central tube is cut off diagonally and covered with a plate, leaving a slit. A bead of match head composition is secured just below the slit. A tape coated with matchbox striker composition passes through the slit with the coated surface in contact with the matchhead composition. The bottom end of the tape is tucked into a pocket soldered to the outside of the central tube. The top end of the tape is secured to the cap and folded over providing a short length of tape to allow the cap to be removed safely without immediately igniting the grenade. The cap is held to the body by bayonet joints. An India rubber washer is fitted into the top of the cap providing a watertight seal for the igniter. A short length of fuze with a "Detonator, No. 8, Mk. VII" crimped onto one end is inserted into the open end of the central tube. This igniter was the cause of many "prematures" and Bombers using the "Pitcher" grenades were often known as members of "The Suicide Club" due to the unreliability of the igniter. The prematures were likely caused because the flash from the friction fuze could travel outside the fuze and if the detonator was not properly crimped and sealed the flash itself could fire the detonator.

The grenade must be primed prior to use. To prime the grenade; a length of fuze is cut off the small roll supplied and a detonator crimped on. It is then inserted in the grenade and the igniter slipped over the end of the fuze. The igniter is secured by matching the cutaway flange on the igniter underneath the collars on the inner cylinder and pressing down the three small tabs. The fact that the fuze was primed in the lines may well have contributed to the high number of prematures.

For use; the cap is removed from the grenade by turning the cap slightly to release the bayonet joints and then giving the cap a sharp jerk. The tape will be pulled across the surface of the match-head composition causing it to ignite and light the safety fuze. The fuze burns for four to five seconds, reaches the detonator and causes it to detonate, which in turn, sets off the main bursting charge.

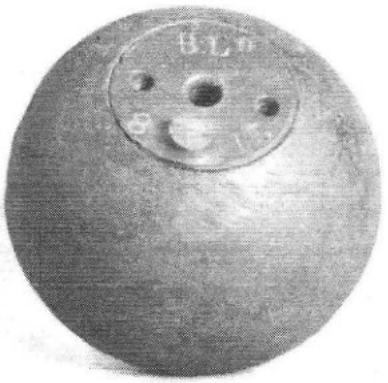
These grenades were packed in wooden boxes containing 25 grenades and two tin boxes. One tin box contains 6 feet of safety fuze and 25 detonators, the other contains 25 igniters and a pair of pliers for cutting the fuze and crimping the detonators.

Grenade, Hand, No. 15 Mk. I [L]

This grenade was designed for use with the spring gun or catapults. It could however be used by hand if necessary. It was officially introduced for service in June 1917. In fact supply began in July 1915 with production ending in August 1916. It was not declared obsolete until 29 July 1920. This was the infamous grenade that failed to ignite at the Battle of Loos in September 1915. According to British Army records there were 288,092 "Ball Grenades" in France on 11 September 1915. A large amount of the production from the end of 1915 onwards was shipped to Allied countries, especially Russia.

TYPE- Fragmentation
WEIGHT- 1 lb. 6 oz.
HEIGHT- 2.75 in.
DIAMETER- 3.0 in.
IGNITER- Brock Lighter
FUSE DELAY- 5 sec.
FILLING- 4 oz.

The body is a spherical cast iron ball 3 inches in diameter, with a large threaded hole in the top. The hole is closed by a closing plug threaded to match the threads in the hole. The closing plug has a hole in the centre to fit the igniter and a small bolt or stud off to the side of the hole. Two copper wires are attached to the bolt/stud to secure the igniter assembly. The body is filled with a bursting charge of 4 ounces of Ammonal or Blastine. The grenade is marked with a red filling ring at the top and a pink band just above the centre of the body. The designation, a manufacturers mark and date of manufacture are marked on the side of the body. These grenades are packed in wooden boxes containing 12 grenades, a tin box containing 12 igniters, and two brassards.



No. 15 Mk. I

The "Detonator, No. 15 or 16 Hand Grenade Mk. I" (known as a Brock Lighter) consists of a length of safety fuze crimped onto a "Detonator, No. 8 Mk. VII. The open end of the safety fuze is covered by a bead of match head composition that is then protected by a lead cap with a tear off tape. The length of fuze used gives a delay of 9 seconds. As an alternate, the same igniter assembly (Nobel's Lighter) used with the Nos. 8 and 9 grenades may be used with this grenade. The igniters are secured by the two wires attached to the closing plug and sealed by a bead of wax around the joint.

For use, the lead cap is torn off by use of the tear off tape exposing the match head composition.. The fuze is ignited by a brassard worn by the thrower. The grenade is then thrown or fired from the spring gun.

Grenade, Hand, No. 16 Mk. I [L]

TYPE- Fragmentation
WEIGHT- 1 lb. 2 oz.
LENGTH- 4 in. w/fuze
3.5 in. body
DIAMETER- 2.5/16 in.
IGNITER- Brock lighter
FUSE DELAY- 9 sec.
FILLING- 4 oz.

This grenade was officially introduced for service in June 1917. In fact the grenade was being supplied from October 1915 and production ceased in August 1916. It was declared obsolete on 29 July 1920. A large amount of the production from the end of 1915 onwards was shipped to Allied countries, especially Russia.

The body is oval in shape and made of cast iron. The interior of the body is segmented to aid in the effective breakup of the body on detonation. A threaded hole in the top accepts a screw plug to hold the igniter. Two copper wires are twisted around the screw plug before it is tightened down. A filling hole in the bottom is closed by a brass or steel closing plug.

No. 16 Mk. I
Photo - Norman Bonney

The "Detonator, No. 15 or 16 Hand Grenade Mk. I" (known as a Brock Lighter) consists of a length of safety fuze crimped onto a "Detonator, No. 8 Mk. VII. The open end of the safety fuze is covered by a bead of match head composition that is then protected by a lead cap with a tear off tape. The length of fuze used gives a delay of 9 seconds. The igniter is secured to the grenade by twisting the copper wire around the igniter after it has been inserted into the grenade.

Markings on the body include a red filling ring at the top of the body and a pink band slightly lower down denotes a filling of Ammonal. The designation, a manufacturers mark, and date of manufacture are marked on the body below the bands.

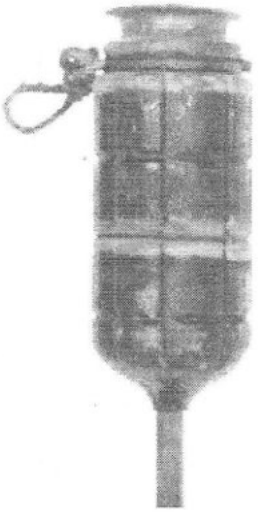
The igniter is the same as used with the No. 15; it consists of a length of safety fuze crimped onto a "Detonator, No. 8 Mk. VII. The open end of the safety fuze is covered by a bead of match head composition that is then protected by a lead cap with a tear off tape. The only difference in the igniter assemblies is the fuze is cut to burn for 5 seconds.

The assembly is secured to the grenade by the copper wires and sealed by a bead of wax around the joint of body and igniter. It is probable that the igniters for the Nos. 8 and 9 grenades could also be used in this one. The grenades are packed in wooden boxes containing 12 grenades, a tin box containing 12 igniters, and two brassards.

Grenade, Rifle, No. 17 Mk. I [L] (RL Percussion Pattern)

TYPE- Fragmentation
WEIGHT- 1 lb. 8 oz.
LENGTH- 4.25 in. overall
3.5 in. body
DIAMETER- 2.5 in.
IGNITER- Percussion/Impact
FILLING- 2 oz.

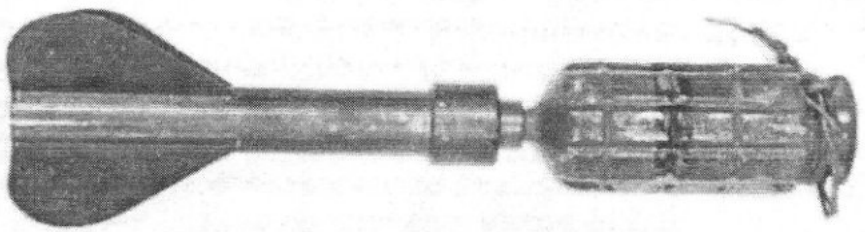
This grenade was also known as the "Opera Hat" grenade. Introduced for service in June 1917 it was likely in use prior to the official date. It is believed that this grenade saw little service if any as it is not mentioned in the Treatise on Ammunition of the period.



No. 17 Mk. I

The body is cast iron made in a cylinder shape with segmentation on the outside. The base of the cylinder is "coned" down with the tip of the cone drilled and threaded to accept the launching rod. The launching rod is 15" long, copper plated, and fitted with a copper gas check on the bottom. The head is made of steel with a hole in the centre. A steel disc with striker mounted is fitted into the centre hole. A copper ring mounted between the steel disc and the main head prevents the striker falling onto the primer until the copper disc is crushed on impact. A primer is mounted in the bottom of the head and is attached to a length of instantaneous fuze and a "Detonator, No. 7". A safety pin fits through the head preventing the striker from coming into contact with the primer.

The body contains a filling of 2 ounces of Ammonal or Amatol 80/20. The grenade was marked with a red band around the top of the body and a pink band around the centre if it was filled with Ammonal. When the grenade is to be fired, the safety pin is removed and the grenade fired. Upon impact, the force of impact pushes the steel disc back onto the copper ring causing it to crush. When the ring crushes the striker coming into contact with the primer, igniting it. The primer ignites the instantaneous fuze, which in turn fires the detonator.



No. 17 grenade fitted with "Tail, No. 17 Rifle Grenade"
Photo - Norman Bonney

Due to delays in acceptance of the No. 17 grenade, it was overtaken by better and less expensive designs. Large numbers of the grenades were converted into an "Aerial bomb" by the attachment of a "Tail, No. 17 Rifle Grenade". Contrary to popular belief these "Aerial Bombs" were not for use from aircraft but were instead used with a small spigot mortar known as the "Hay Pocket Howitzer". There are few accounts of its use and it is assumed it was not a very popular weapon.

Grenade, Hand, No. 18 Mk. I [L]

TYPE- Fragmentation
WEIGHT- 2 lb.
LENGTH- 12.625 in. total
5.75 in. body
DIAMETER- 1.75 in.
2.75 in. overall
IGNITER- Percussion/Impact
FILLING- 3 oz.

Otherwise known as one of the RL Percussion Patterns, this grenade was officially introduced for service in June of 1917 although it had been in use for about two years before that. It is in fact a modified No. 1 Mk. III that takes a more easily produced detonator.

The body may be made of phosphor-bronze as an alternative to brass. There are stops on opposite sides of the body to engage the lower edge of the cap. The stops prevent the entry of the cap except when the cap is turned to the fire position. The indentations on the cap engage indentations on the body at the remove position. A part turn of the cap causes one of the cap indents to spring into the travel indent on

the body. When the cap is turned to fire the cap indents travel along a groove until they are opposite the fire indents that extend down the body.

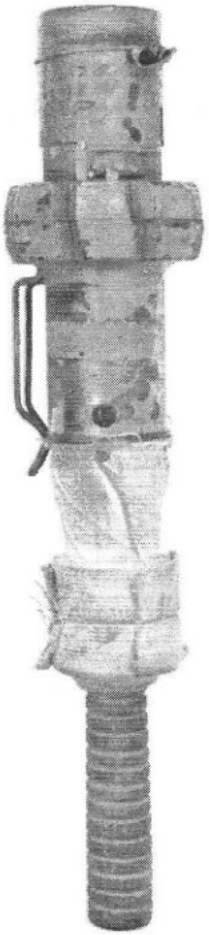
The cap may be made of brass or alternatively, phosphor-bronze. The cap is made up of the weighting washer as an end
piece and a piece of tubular brass with the end of the tube spun into a groove on the side of the washer. There are slots at the fire position that interact with stops on the body. Two indents are made in the cap and two projections to facilitate turning the cap. The striker is mounted centrally in the washer. The striker is shorter than that on the No. 1 grenade and has a peg offset to the side to strike the rim of the percussion cap. The cap fits the body tightly so that it will not turn with a pressure of five pounds but will under a pressure of 21 pounds.

The fragmentation ring may be made in two parts or as a single piece. The ring is held onto the body by a projecting ring on the body and a fillet of solder on the opposite side of the ring. The carrying hook has the ends bent to conform to the shape of the body and embedded in the fillet of solder.

The handle and block are formed of a single piece of wood. Four streamers of 1.5 inch webbing are attached to the part of the block that projects out from the body of the grenade. During transit the streamers are wound around the handle and secured with twine.

The filling may be Ammonal or Amatol 80/20. The "Detonator, No. 18 Hand grenade Mk. I" consists of a flanged holder similar to the upper part of the "Detonator, No. 1 Hand grenade, Mk. III. The diameter is slightly increased and it has an internal shoulder to support a .22 rimfire cap. The cap is crimped onto a short length of instantaneous fuze that passes through the holder and is crimped onto a Nobel's No. 7 detonator. The grenade is marked with a red filling ring and a pink band if filled with Ammonal. A green band denotes a filling of Amatol 80/20. The designation and a manufacturers mark are stamped into the wood block below the brass body.

When the grenade is thrown and upon impact, the cap is driven in until the striker hits the percussion cap. The cap fires igniting the instantaneous fuze which then fires the detonator. The detonator then fires the main bursting charge.



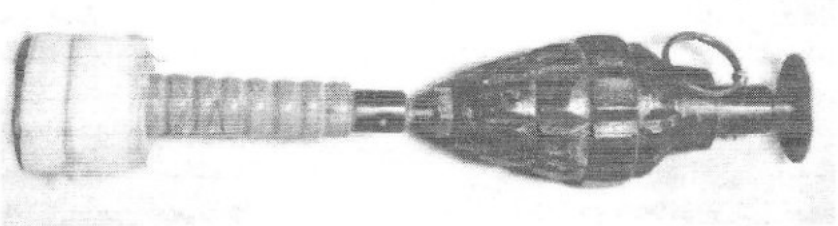
No 18 Mk. I
Photo - Norman Bonney

Grenade, Hand, No. 19 Mk. I [L]

TYPE- Fragmentation
WEIGHT- 1 lb. 10 oz.
LENGTH- 11.5 in. overall
6.0 in. body
DIAMETER- 2.25 in.
IGNITER- Percussion/Impact
FILLING- 2.5 oz.

This grenade was originally known as the "T.W.D. Percussion Pattern"(Trench Warfare Department). Although officially introduced for service in June 1917 this grenade was in the hands of the B.E.F. as early as 1915. It was declared obsolete on July 19, 1920.

The body is a pear shaped container, externally segmented and made of cast iron. The top of the body has a large threaded opening to fit the igniter assembly and the base has a smaller, threaded, filling hole closed by a brass base plug. The base plug has a hexagon head so it can be tightened by a wrench. A wooden handle attached to a short steel shaft screws into the base plug. Three webbing tails, 18 inches long, are attached to the bottom end of the handle. A brass detonator holder assembly screws into the top hole and down into the body until it rests against a flange at the bottom of the hole. There is a tubular extension either formed integrally with the brass collar or formed of a copper or brass tube sweated onto it. A striker collar then screws into the top of the body over the detonator socket. The collar is centrally bored and a shoulder is formed near the bottom end to support the .380 Eley cap.



No. 19 Mk. I (TWD Percussion Pattern)

A steel spring set into a groove just above the cap holds it in place. Two sets of holes are drilled through the sides of the collar, the top set for the safety pin, the lower set for the shear wire. The striker assembly is formed of a steel spindle with a mushroom head riveted on. Two holes through the striker match with the holes in the collar. The striker is fitted into the collar and held above the cap by a copper shear wire and the safety pin, both of which are put in place through the matching holes in the collar and striker.

The grenade is filled with Ammonal, Amatol 80/20, or Bellite. The grenades are marked with a red filling ring around the top of the body with a different coloured band below that to distinguish the different fillings. A filling of Amatol is distinguished by a green band, Ammonal by a pink band, and Bellite by the absence of a second band. A manufacturers mark will normally be cast into the side of the body. The mushroom head will also be marked with the manufacturer and date of manufacture.

The grenades are packed in wooden boxes containing 12 grenades and a tin box (No. 30) containing 12 detonators. The detonators used are designated "Detonator, No. 8 large, Mk. I".

The grenades must be primed for use. To prime the grenade, the igniter assembly must be removed, the detonator inserted and the assembly replaced and tightened down with a wrench. The grenade is thrown by removing the twine holding the tails, pulling the safety pin, at which point the striker is held in place by the shear wire, and the grenade thrown. The grenade will travel with the head to the front due to the drag caused by the webbing tails. On impact, the striker is driven in shearing the wire and striking the cap. The cap flashes into the detonator causing it to fire and in turn set off the main bursting charge. It should be noted that a drop of a few feet onto its head could shear off both the safety pin and shear wire causing the grenade to explode. Care was also required in the act of throwing to ensure the grenade did not hit the back of the trench as the thrower took his swing and cause the grenade to go off in his hand.

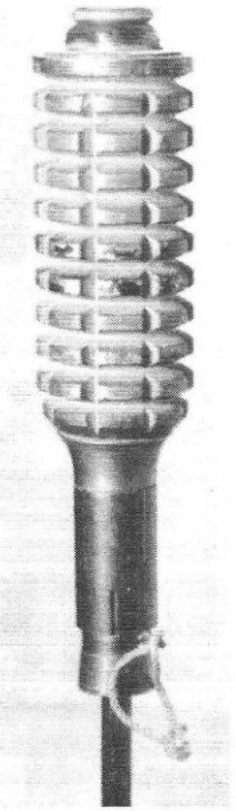
Grenade, Rifle, No. 20 [L]

The No. 20 grenade was issued for land service only. It was also known as the "Vaneless" pattern. It was introduced for service in June of 1917 (officially) but was actually in the hands of the troops as early as 1915. It was declared obsolete on 23 January 1919. The grenade was produced in several versions as noted below.

Grenade, Rifle, No. 20 Mk. I [L]

TYPE- Fragmentation
WEIGHT- 1 lb. 4 oz.
LENGTH- 6.25 in. body
DIAMETER- 1.5 in.
IGNITER- Percussion/Impact
FILLING- 2 oz.

The body is formed of a cylindrical steel tube with deep segmenting grooves running both longitudinally and vertically. It is similar in looks to the body of the No. 3 Mk. II. The interior of the body is varnished to prevent corrosion. The top end is closed by a brass plug with a threaded socket to fit a detonator. The bottom end is closed by a brass base piece shaped to match the bottom of the body and with a cylindrical extension. The base piece is bored out to form an extension to the central tube. The central tube consists of a brass tube that fits between the base piece and top plug forming a channel for the detonator and striker. The striker (needle pellet) is contained within the base piece and held in place by two retaining bolts. It is constructed of brass with a turned down section in the centre and has a tapered end that the needle is fitted into. Grooves are cut longitudinally along the sides of the pellet to allow the free transition of air and prevent any checking of forward movement. A releasing socket is fitted over the cylindrical portion of the base piece. It is slotted at the front end and provided with an internal flange that forms a clutch in conjunction with a rib formed on the base piece. The releasing socket covers the retaining bolts holding them in place. After the striker and creep spring are in position and the releasing socket fitted, the base is closed by a brass base plug with a conical section on the bottom end. The releasing socket is slotted to it will grip the conical part of the base plug when it is in the set back position. A copper or phosphor bronze safety pin fits through the base plug below the releasing socket preventing it from moving out of position. A "Rod, .303 inch rifle grenade, 10 inch, Mk. I" is screwed into the base plug and locked in position by a setscrew.



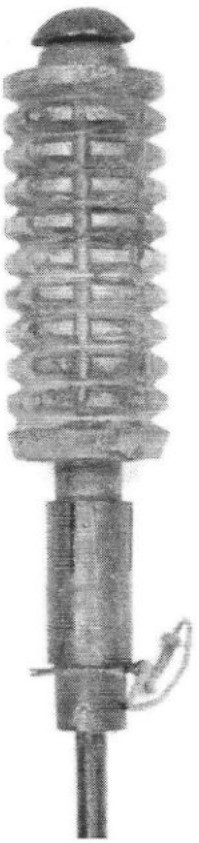
No. 20 Mk. I

The detonator assembly may be either the "Detonator, Rifle grenades, Mk. I" with "B" filling or the "Detonator, Rifle grenades, Mk. II". The filling may be either Tonite pellets coated with paraffin wax, Amatol 80/20, Ammonal, or Cilferite in a paper container. The grenades are filled from the top end and sealed in place by the body plug. If Cilferite is used as a filling the container, made of waxed paper with a central tube of waxed paper, is closed at the bottom end by a close fitting cardboard washer and sealed by a layer of paraffin wax. The explosive is stemmed in and the top finished off with another washer and sealed with paraffin wax. Use of Cilferite eliminated the need to varnish or lacquer the inside of the body.

The grenade is painted yellow with a red filling ring around the top end of the body. In early issues a pink band around the centre indicated a filling of Ammonal, Military Ammonal, or Alumatol. In later issues a green band indicates a filling of Amatol. Other explosive fillings have no distinguishing band but the packing boxes are marked with the nature of the filling. The designation, a manufacturers mark and date of manufacture are stamped into the top body plug.

The grenades are packed in wooden boxes containing 20 grenades, a tin cylinder containing 20 detonator assemblies, and another cylinder containing 22 launching cartridges.

The grenades are packed unfuzed with an ebonite shipping plug in the detonator well. For use they must be primed by removing the shipping plug, checking to see if the striker pellet is properly held in place, and screwing in a detonator assembly. The grenade can then be fired by inserting the launching rod into the barrel of the rifle, loading the rifle with a launching cartridge, pulling the safety pin and firing the rifle. When the rifle is fired the grenade is discharged from the rifle, the shock of discharge causes the releasing socket to set back and unmask the retaining bolts. On impact the striker sets forward, ejects the retaining bolts, overcomes the resistance of the creep spring and hits the primer. The flash from the primer sets off the detonator effecting the detonation of the main charge.



No. 20 Mk. I Converted

Grenade, Rifle, No. 20 Mk. I Converted [L]

TYPE- Fragmentation
WEIGHT- 1 lb. 4 oz.
LENGTH- 6.25 in. body only
DIAMETER- 1.5 in.
IGNITER- Percussion/Impact
FILLING- 2 oz.

This grenade was a conversion of a No. 3 Mk. I with a square base to the standards of a No. 20 Mk. I. This involves removing the wind vanes, turning down the base piece to provide a parallel portion which extends beyond the releasing bolts. A ridge is formed at the position of the retaining for the releasing socket. A lengthened releasing socket is fitted with a pin acting as a stop to forward movement. A safety pin is fitted through the base piece below the releasing socket holding it in position. A shortened central tube is fitted as an extension of the central passage in the base piece. The grenade is fitted with a "Rifle rod, 10 inch Mk. I".

The detonator assembly is the "Detonator, No. 20 converted grenade, Mk. I [L]". It is fitted with a smaller detonator containing 32.5 grains of fulminate of mercury compound. The shortened central tube allows the detonating impulse from the detonator to more easily impart itself to the main filling.

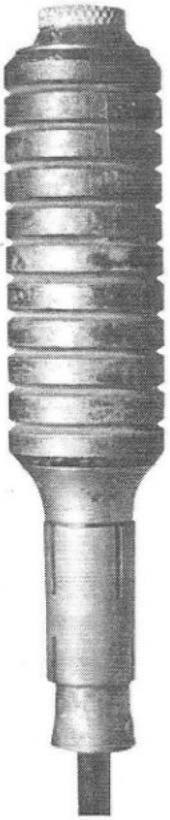
The markings on the body remain the same but the stamped markings of the No. 3 Mk. I are barred out and the grenade restamped with "No. 20 C.I. In addition the manufacturers mark and date of completion will be stamped into the top body plug. A red filling ring is painted around the top and a coloured band around the centre of the body denotes the filling. Pink for Ammonal, Alumatol, or Military Ammonal and a green band for Amatol 83/17.

TYPE- Fragmentation
WEIGHT- 1 lb. 4 oz.
LENGTH- 6.25 in. body only
DIAMETER- 1.5 in.
IGNITER- Percussion/Impact
FILLING- 2 oz.

Grenade, Rifle, No. 20 Mk. II [L]

The main differences between the No. 20 Mk. I and Mk. II are in the body and striker. The body is formed of thin walled tubing with horizontal grooving only. The top end of the body is shaped to give a rounded head in conjunction with the body plug. The first issues of the Mk. II had the same sharp striker as used in the Mk. I, these were recalled and reissued with a blunt striker and different detonator.

Markings include a red band around the top of the body and the designation, manufacturers mark, and date of manufacture are stamped into the top body plug. A pink band around the centre of the body denotes a filling of Ammonal, Military Ammonal, or Alumatol. A green band indicates a filling of Amatol. A filling of Tonite has no distinguishing band.



No. 20 Mk. II

Grenade, Rifle, No. 20 Mk. II Converted [L]

TYPE- Fragmentation
WEIGHT- 1 lb. 4 oz.
LENGTH- 6.25 in. body only
DIAMETER- 1.5 in.
IGNITER- Percussion/Impact
FILLING- 2 oz.

This is the conversion of a No. 3 Mk. II with rounded base to a No. 20 Mk. II. In this case the body will have both vertical and horizontal segmentation to the body. The conversion is similar to the Mk. I conversion with the exception that the stop for the forward end of the releasing socket is a shoulder on the base piece. The curved portion of the base piece is then reshaped to merge into the parallel portion. The detonator used is the "Detonator, No. 20 converted grenade, Mk. I".

The body is marked with a red filling ring and a coloured band denoting the filling. A pink band denotes a filling of Ammonal, Alumatol, or Military Ammonal, a green band indicating Amatol. A filling of Cilferite "C" has no distinguishing band but the shipping boxes will be marked with the type of filling. The top closing plug is stamped with the new designation, date of completion, and manufacturers mark.

Grenade, Rifle, Drill, No. 20 Mk. I

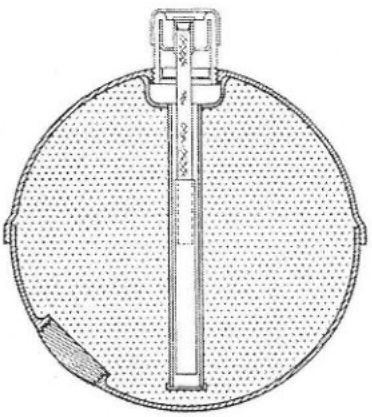
These grenades are made exactly the same as live versions but have no explosive content. To identify them as a drill store the body of the grenade is painted white. Dummy detonator holders are distinguished by the bottom not being closed.

Grenade, Spring-Gun, No. 21 Mk. I [L]

TYPE- Offensive
WEIGHT- 1 lb.
LENGTH- 3.75 in. body
4.2 in. w/igniter
DIAMETER- 3.75 in.
IGNITER- Brock Lighter
FUSE DELAY- 5 sec.
FILLING- 8 oz.

This grenade was designed for firing from the West Spring-Gun but could be used by hand if necessary. Originally known as the "Cylindrical "R" Type" it was officially introduced for service in June 1917 but was in use as early as 1915. It was declared obsolete on 29 July 1920.

The body is round and formed in two parts of sheet steel. The lower half of the body has a filling hole offset from the centre that is closed by a brass closing plug. The upper half fits over the rim of the bottom half and is soldered in place. An opening is located in the centre of the top section. A tin detonator tube is soldered under the top opening and passes through the centre of the body.
A filling of Ammonal or Amatol 80/20 is stemmed in through the filling hole in the bottom section of the grenade.



The "Detonator, Spring gun grenade, No. 21 Mk. I" consists of a brass holder, percussion cap, length of No. 14 Bickford fuze, and a "Detonator, No. 8 large, Mk. I". The holder is stamped to provide a recess for the head of the cap and is threaded on the bottom end. A perforated tin cup fits into the holder with the cap protruding out the bottom. The cap is secured in place by expanding its lower end over the tin cup. A tin washer is fitted over the fuze and secures the fuze by gripping spike formed in the washer. The washer holds the fuze in position under the cap. The detonator is crimped onto the other end of the fuze. A tin cap slips over the holder protecting the cap from accidental blows.

The grenade is marked with a red filling ring around the top of the body with a

pink band around the centre to denote a filling of Ammonal or no band when filled with Amatol. The filling plug is marked with the Mark, a manufacturers mark, and the date of manufacture.

The grenades are packed in wooden boxes containing 12 grenades and a tin box holding 12 detonator assemblies.

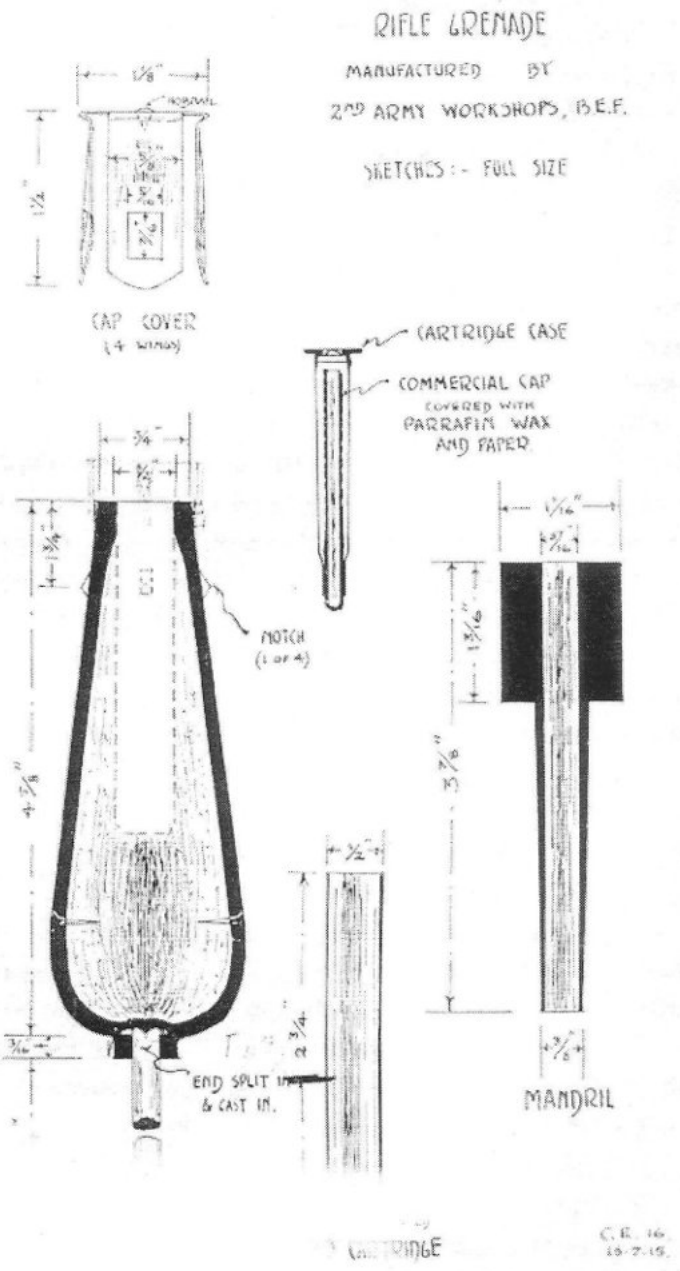
Before firing, the grenade must be primed. The detonator is inserted in the top opening and screwed into place. For firing, the tin cap is removed from the grenade and it is placed in the spring gun with the cap opposite the striker. When the gun is fired, the striker flies forward and strikes the cap as the grenade is being discharged. The cap ignites the fuze that burns down to the detonator. When the detonator fires it detonates the main bursting charge.

Grenade, Rifle, No. 22

The No. 22 began its life as the "Newton Pippin" grenade, invented by Captain Henry Newton (later Lt. Col. Newton CBE DSO). It was initially produced in the 2nd Army Workshop at the "Ecole Nationale Professionnelle" in Armentieres France. The grenade was used at "Loos" in May of 1915.

It consisted of a cast iron body with external segmentation. The body was somewhat pear shaped with the large portion at the bottom. A 15 inch launching rod was mounted into a projection cast onto the bottom. The detonator assembly consisted of a normal .303 cartridge casing with a commercial detonator covered with paper and wax inserted so that the flash from the primer would fire the detonator. The igniter consists of a tin cap with a striker mounted centrally. The cap clipped over the top of the grenade engaging in four lugs cast onto the body. After the grenade is fired and on impact, the cap is driven down onto the body allowing the striker to hit the primer and so explode the grenade.

When the grenade was adopted by the War Department, it was redesigned and redesignated the No. 22 for land use only. The Mk. I was introduced in List of Changes #18689 on 1 March 1916; the Mk. II was officially introduced on 24 Oct. 1917 well after the grenade was actually in use at the front. It was produced for long range firing, to give a range of approximately 350 yards.

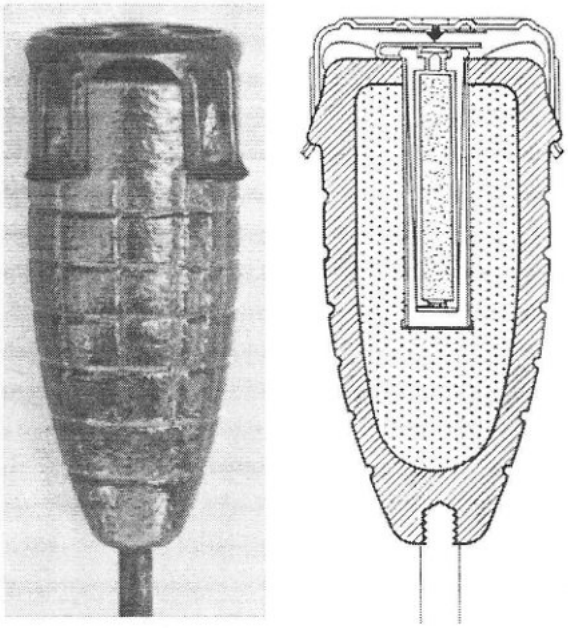


Original Drawing of the Newton-Pippin Grenade that was sent to the War Department

Grenade, Rifle, No. 22 Mk. I [L]

TYPE- Fragmentation
WEIGHT- 1 lb. 9.5 oz.
LENGTH- 4.25 in. w/o rod
DIAMETER- 2.0 in.
IGNITER- Percussion/Impact
FILLING- 2.5 oz.

The body is cast iron in a conical shape with a flat head. The outside is segmented and the body is lacquered both inside and out. A threaded hole in the bottom extends up into the body but not all the way into the filling cavity. A hole in the top of the body fits the detonator assembly. It appears that there were also bodies made without the external segmentation made for experiments. These had a flat safety strip instead of the safety pin.



No. 22 Mk. II

The "Detonator No. 22 grenade, Mk. I" consists of a Mk, VII .303 cartridge case with a tin shield fitted over the rim and the inside lined with paper. A shortened "Detonator, No. 8 Mk. VII" is inserted into the cartridge case with the open end toward the primer. The mouth of the casing is spun over to retain the detonator in place. The end of the casing is then sealed with a plug of tallow.

The launching rod (Rod, .303 inch rifle grenades, Mk. II) screws into the base of the grenade and consists of a straight steel rod 15 inches long. A gas check consisting of a copper cup fits over a reduced portion of the rod and is retained by riveting over the end of the rod.

The cover is stamped from thin sheet steel and has four spring arms that correspond with lugs cast onto the body. The spring arms and lugs retain the cap in position on the grenade. A striker is mounted in the centre of the cover and is held off the primer by the tin shield. A safety pin fits through the cover to provide a safe method of transport. The cap with safety pin was a home (in Britain) design feature.

The grenade is filled by stemming with either Ammonal or Amatol 80/20. A cavity is left in the filling, immediately below the top opening, for a paper tube secured in the opening by paraffin wax or Pettmans cement. The grenade is marked with a red filling ring immediately below the lugs on the body and will have another ring below that to designate the filling. A pink ring denoting a filling of Ammonal and a green ring denoting Amatol. The Mark number, date of manufacture, and manufacturers mark are stamped or cast into the body near the base.

The grenades are packed in wooden boxed containing 12 grenades, two tin boxes containing 6 detonator assemblies each, and another tin box containing 12 launching cartridges. The launching cartridges used with this grenade contain a 43 grain charge. Also included in the box is a key for removing the cover.

The No. 22 Mk. I grenades were prone to premature detonation due to the cap being too heavy. Upon firing the rifle, the grenade would sometimes detonate immediately due to the setback caused by firing. The grenades were withdrawn from service due to the danger to the firer.

Grenade Rifle No. 22 Mk. II [L]

TYPE- Fragmentation
WEIGHT- 1 lb. 8 oz.
LENGTH- 4.25 in. w/o rod
DIAMETER- 2.0 in.
IGNITER- Percussion/Impact
FILLING- 2.5 oz.

The No. 22 Mk. II was a modification of the Mk. I utilizing the same body but having a modified cap. The cap has been redesigned, made out of lighter material and has no safety pin. The introduction of the lighter cap solved the problem of the grenade going off prematurely when the rifle was fired. Marking is as for the Mark I but the designation cast into the base is changed to "II".

Special Uses for the No. 22 Grenade

In January and February of 1916 the 4th Cdn. Infantry Brigade of the 2nd Canadian Division undertook experiments to convert the No. 22 or Newton grenade to message carriers to be used in the event of failure of other communication means. This took the form of removing the explosive and detonator from the grenade and modifying the cap. Messages could then placed inside a .303 cartridge casing and put in place of the detonator. The cap was modified by having four holes punched in it and the magnesium projectile from a 1.5 inch Very Light wired onto it. A piece of No. 10 Safety fuze, cut to burn for 10 seconds, was then wired to the fuze end of the magnesium projectile.

The grenade was prepared by inserting a message in the cartridge casing, inserting it into the grenade, and finally

clipping the cap with flare attached in place on the grenade. The fuze was then lit and the rifle fired. The signal was to attract the attention of the recipient to the point where the grenade fell. The signal gave a bright light at night and a smoke trail during the daytime. The average distance achieved with this grenade was 295 yards.

Further tests were undertaken with some modifications. These involved cutting the grenade off immediately below the lugs and attaching a one inch flare. The ammunition used to fire the grenades was normal service ammunition with the bullet removed. Upon firing from a Ross rifle with the barrel cut off to 23.5 inches an average range of 390 yards was obtained. Other tests from the same rifle with full size grenades gave results of 355 yards. It was discovered that the use of a 1 inch flare did not make much difference in locating the grenade after firing but it did increase the range to a marked degree. It is unknown how far these experiments were carried but the ideas and results were sent up as high as the Commander of the Canadian Corps.

Grenade, Hand or .303 inch Rifle, No. 23

The No. 23 Grenade is a modification of the No. 5 to enable it to be fired from a rifle at short ranges. There are in fact six marks of the No. 23 grenade (live) that have been introduced at different times. For use as rifle grenades, the rifle must be equipped with a discharger cup, either the "Cup No. 23 Rifle grenade, No. 1 Mk. I" for use with the SMLE or the "No. 4 Mk. I" for use with the P14 (No. 3) rifle. These launchers will be covered in detail later in this book. The No. 23 grenades were manufactured between July 1916 and March 1918, during which time some 30 million grenades were produced. The main body of the No. 23 grenade is not painted. The original specifications called for the bodies to be varnished, inside and out, with a solution of "Gum Shellac" and methylated spirits. The No 23 could later be rustproofed instead of varnished by either of two proprietary methods, the "Fermangan process" or "Coslettizing".

Grenade, Hand or .303 inch Rifle, No. 23 Mk. I [L]

TYPE- Fragmentation
WEIGHT- 1 lb. 9 oz.
LENGTH- 3.75 in.
DIAMETER- 2.3 in.
IGNITER- Time Delay
FUSE DELAY- 5 sec.
FILLING- 2 oz. 2 dr.

The No. 23 Mk. I was introduced for service on 27 June 1916 but was in the hands of the B.E.F. well before that, perhaps as early as 1915. It was a parallel development with the No. 5 originally designed as a rifle grenade but later adopted for the dual role. It was declared obsolescent on 2 October 1917 and obsolete on 6 May 1920.

No. 23 Mk. I

The grenade consists of an oval shaped cast iron body with external segmenting grooves. The bottom is open and threaded, there is a filling hole high up on the side, and there is a hole through the top. There are two stepped shoulders cast on the top flanking the top hole. The body is lacquered both inside and out. A centrepiece fits into the bottom hole and screws into the threads in the body. The cup portion screws into the threads in the body providing a chamber for the cap holder. The stalk of the centrepiece provides a central passage for the striker and spring and has a side chamber for the detonator. The central passage lines up with the top hole on the body. When the centrepiece is screwed in, it is screwed fully up leaving a threaded portion at the bottom of the grenade. A base plug is then screwed into the remaining threads. The base plug is strengthened over that of the No. 5 to enable it to withstand the shock of discharge. The base plug may be made of solid brass or iron. A 5.5 inch, copper coated, steel launching rod screws into the centre of the base plug.

The striker and striker spring fit up through the centrepiece before the base plug is screwed on. The striker is a steel spindle with a turned groove at the top to form a catch similar to the head of a nail. It has a head at the bottom end that forms a support for the spring and has two striker points formed on the bottom. The striker lever is formed of a strip of steel bent to conform to the contour of the body and having flanges on the top end. The flanges may extend the whole length of the lever tapering down to the end or may be formed only at the top, depending on the manufacturer. The flanges are turned up forming a channel to strengthen the lever. Holes through the flanges are fitted with a steel pin that extends out past the flanges to form a pivot. The striker lever fits between the shoulders on the body with the pivot fitting

in grooves in the shoulders. The end of the lever engages the top of the striker holding it up with the spring compressed. A safety pin fits through holes in the lower step of the shoulders and through corresponding holes in the striker lever or over the top of the lever and hold it down in the safe position.

The detonator assembly consists of a cap holder, length of fuze, .22 rim fire cap, and detonator. The rim fire cap is held in the cap holder by expanding its inner end. The cap holder may be made of brass, aluminum, or zinc alloy. It has a section designed to fit into the bottom end of the central tube and a rim to prevent it being inserted too far. The bottom is slotted to receive the fuze. The fuze may be "Fuze, Safety, No. 11 Mk. 1" or "Bickfords No. 14". It is attached to the cap holder and bent around so that the detonator fits into its chamber. The detonator is crimped onto the opposite end of the fuze. A No. 6 detonator is used. The detonator assemblies are designed to give a delay of 5 seconds.

The filling may be Ammonal or Alumatol. It is stemmed in through the filling hole that is then closed by a filling plug. The filling plug may be made of brass, aluminum, or a zinc alloy. The grenades all have the normal red filling ring painted around the top. In the first issues of grenades the fillings were denoted by coloured bands below the red filling ring. A pink band indicates Ammonal. In addition to painted markings the base plug is stamped with the designation, manufacturers mark, and date of manufacture. The grenades are shipped unfuzed in wooden boxes containing 12 grenades, a tin with 12 detonator assemblies, a tin containing 13 launching cartridges, 12 launching rods, and one key for tightening the base plug. The boxes are distinguished from the No. 5 boxes by the letter "R" stenciled in black onto a white background on the cleats at the end of the box.

Grenade, Hand or .303 inch Rifle, No. 23M Mk. I [L]

This grenade is nothing more than the No. 23 Mk. I with fillings more suitable for use in tropical climates. The fillings used are Trotyl, Baratol, Abelite, or Cilferite. According to WOLC (War Office List of Changes) the grenade was introduced on 20 November 1917 and declared obsolete on 6 May 1920. The grenade is marked with a ring of red "Xs" instead of a red band. This grenade will not have a pink ring due to the type of explosives used. The base plug is marked with the designation, manufacturers mark, and date of manufacture. The packing boxes are additionally marked with the letter "M" painted in black.

Grenade, Hand or .303 inch Rifle, No. 23 Mk. II [L]

TYPE- Fragmentation
WEIGHT- 1 lb. 9 oz.
LENGTH- 3.75 in.
DIAMETER- 2.3 in.
IGNITER- Time Delay
FUSE DELAY- 5 sec.
FILLING- 2 oz. 13 dr.

This grenade is a modification of the Mk. I. It was introduced for service on 4 July 1917 well after the time it was actually in use. It was declared obsolescent on 2 October 1917 and obsolete on 17 February 1921 (WOLC).

The modifications required were fairly minor; the body remained the same with modifications being made to the base plug, striker, striker lever, and centrepiece. The base plug is made of cast or malleable iron and has a ridge cast across the face. A widened portion in the centre of the ridge forms a boss for the launching rod to screw into. The striker is modified by having a slot cut across the head to allow the escape of gases. The striker lever has flanges only at the top with a corrugation running part way down the lever to add strength. The centre piece is formed from a steel cup with brass or copper tubes sweated onto it or from cast iron with the central tube formed integrally with it and a brass or copper detonator well sweated on. Both styles are electrically tinned and lacquered.

No23 Mk. II

The detonator used is the "Detonator, No. 23 Mk. II grenade, Mk. IV[L]. It is similar to the Mk. III but the head of the cap holder is increased in length and the slot for the fuze cut deeper. The filling may be Ammonal, Alumatol, Amatol 80/20, Amatol 83/17, Cilferite "C", or Military Ammonal.

The grenade is marked with a red filling ring around the top portion of the body and another ring denoting the type of filling. A pink band for a filling of Ammonal

or Alumatol and a green band for Amatol. The base plug is marked with the designation, manufacturers mark, and date of manufacture. The grenades are packed in wooden boxes containing 12 grenades and a tin cylinder containing 12 detonator assemblies. The launching rods and launching cartridges are issued separately in bulk. The boxes are marked with the letter "R" on a dark yellow background painted on the cleats at the end of the box.

Grenade, Hand or .303 inch Rifle, No. 23M Mk. II

This is simply a No. 23 Mk. II with different fillings suitable for use in tropical climates. It was officially introduced for service on 16 November 1917 and declared obsolete on 17 February 1921. The fillings used are Trotyl, Baratol, Abelite, or Cilferite. The grenade is marked by a ring of red X's instead of the red filling ring. The pink ring denoting type of filling will not be found on the No. 23M Mk. II. The base plug will be marked with the designation, a manufacturers mark, and date of manufacture. In addition the boxes were marked with the letter M in black paint.

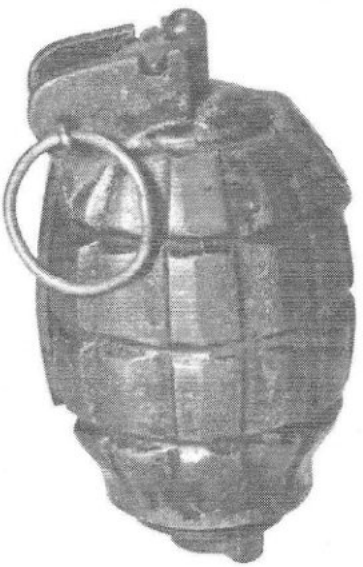
Grenade, Hand or .303 inch Rifle, Practice, No. 23 Mk. II

This is the practice version of the No. 23 Mk. II. The grenade is made in exactly the same manner as a live version but is weighted with sand in place of the filling and the grenade is painted white. The base plug is marked with the designation, manufacturers mark, and date of manufacture. It is supplied with a "Detonator, No. 23 grenade, Mk. I (Dummy)".

Grenade, Hand or .303 inch Rifle, No. 23 Mk. III

TYPE- Fragmentation
WEIGHT- 1 lb. 9 oz.
LENGTH- 3.75 in.
DIAMETER- 2.3 in.
IGNITER- Time Delay
FUSE DELAY- 5 sec.
FILLING- 2 oz. 13 dr.

This version of the No. 23 shows a marked difference from the earlier versions. It is a completely redesigned grenade, easily distinguished from a Mk. I or Mk. II. It was officially introduced for service on 20 November 1917 and declared obsolete on 17 February 1921. The body is cast iron and differs from the earlier body in several details. The filling plug is lower down on the side and larger, the shoulders are of a new design, and the body is recessed for the safety lever. The base is threaded more deeply to provide more support to the centrepiece.



No. 23 Mk. III

The striker is of a new design that eliminates the nail type top and replaces it with a slot to engage the striker lever. The head is provided with two striker points and a slot through the centre to allow gas to escape. The striker lever is stamped out of a flat piece of steel. The pivots are integral with the lever and rounded on the bottom instead of being a pin fitting through flanges on the lever. The design included a hexagonal shaped base plug so it could be tightened with a wrench. It is more commonly found with the thumbscrew type base plug first used on the Mk. II.

The grenade is used with Detonator, No. 23 grenades, Mk. V. The filling may be Ammonal, Alumatol, Amatol 80/20, Amatol 83/17, Cilferite "C", or Military Ammonal. They are stemmed in through the filling hole.

The grenade was protected against moisture by several methods. The most common was by coating the centrepiece with a waterproofing compound (paraffin wax and tallow) and closing the joint between the body and striker with a waterproofing compound. It may also be sealed with shellac or a lead washer coated with waterproofing compound may be fitted into the body and have the centrepiece screwed tightly down onto it for waterproofing.

The grenade is marked with a red filling ring around the top portion and a differently coloured ring around the middle. The middle ring denotes the type of filling, a pink ring means a filling of Ammonal or Alumatol and a green band denotes a filling of Amatol, Trotyl, or Baratol. The base plug is stamped with the designation, a manufacturers mark, and the date of manufacture.

The grenades are packed in "Box, Grenades, G5 Mk. III". Included in the box with the grenades is a tin containing the detonator assemblies and a base plug wrench. The launching rods and cartridges are separately supplied.

Grenade, Hand or .303 inch Rifle, No. 23M Mk. III

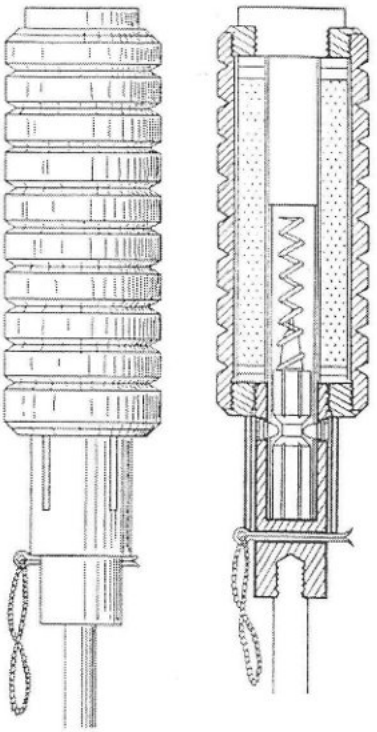
This is simply the No. 23 Mk. III filled with different explosives which are suitable for use in tropical climates together with more certain sealing. It was introduced for service on 16 November 1917 and declared obsolete on 21 May 1921.

The fillings may be Trotyl, Baratol 80/20, or Cilferite "C". The red filling ring is replaced by a ring of red "X" to denote the tropical filling. These grenades will not be found with a pink ring but may be found with green rings.

Grenade, .303 Rifle, No. 24

The No. 24 grenade was a development of the No. 20 Mk. II to economize on materials and facilitate manufacturing of the grenade. It was produced in two versions. The grenade was introduced into service in the autumn of 1916 but was not officially introduced until June of 1917 as the No. 24 Mk. I. The grenade is also known as the "Vaneless Pattern, Modified".

Grenade, .303 Rifle, No. 24 Mk. I [L]



TYPE- Fragmentation
WEIGHT- 1 lb. 2 oz.
LENGTH- 5.4 in. overall
4.0 in. body
DIAMETER- 1.4 in.
IGNITER- Percussion/Impact
FILLING- 1.5 oz.

The body is identical to the No. 20 Mk. II. It is formed of thin walled steel tubing with horizontal segmentation only. The thickness of the body plug is reduced by eliminating the chamfered portion giving the head of the grenade a more squared profile.

The base piece and base plug are formed in one piece and are shortened by the elimination of the curved portion below the body and the tapered portion on the bottom. The releasing socket is shortened and has the rear slots eliminated. The base piece is bored out to make a chamber that is then lined with the central tube. The central tube projects about halfway up into the body. The needle pellet is shortened by reducing the length of the recess in the middle. The releasing pellets are made of brass and engage in the recess to hold the needle pellet in a safe position. The striker is blunt and mounted in the end of the needle pellet. The safety pin fits through the base piece just below the releasing socket holding it in place. A 15 inch launching rod screws into the base piece. The filling is either ammonal, Alumatol, Cilferite "C", Amatol 83/17. or Amatol 80/20 in paper containers. In later issues of the grenade the interior of the paper container is coated with Pettman's cement. The "Detonator No. 24 grenade, Mk. I[L]" is derived from the "Detonator, Rifle grenades, Mk. II". The brass tube is shortened and provided with separate screwed head that is formed as an adapter. The head is secured to the tube by a brass closing plug. The detonator itself contains 32.5 grains of detonating composition (80 percent Fulminate of Mercury and 20 percent Chlorate of Potash) and is fitted into the forward end of the holder. It is held in position by several felt wads and the closing plug. This detonator is not interchangeable with earlier models so to prevent mistakes, the threaded portion is increased in size.

The grenade is marked with a red filling ring around the top of the body and a coloured band around the centre of the body. A green band denotes a filling of Amatol, a pink band denoting Ammonal or Alumatol. The body plug is marked with the designation, manufacturers mark, and date of manufacture.

For use the grenade must be primed. This involves removing the shipping plug, checking to see if the striker pellet is properly held in place, and screwing in a detonator assembly. The grenade can then be fired by inserting the launching rod into the barrel of the rifle, loading the rifle with a launching cartridge, pulling the safety pin and firing the rifle. When the rifle is fired the grenade is discharged from the rifle, the shock of discharge causes the releasing socket to set back, and fall off the grenade. This unmasks the retaining bolts. On impact the striker sets forward, ejects the retaining bolts, overcomes the resistance of the creep spring and hits the primer. The flash from the primer sets off the detonator effecting the detonation of the main charge.

Grenade, .303 inch Rifle, No. 24 Mk. II [L]

TYPE- Fragmentation
WEIGHT- 1 lb. 2 oz.
LENGTH- 5.4 in. overall
4.0 in. body
DIAMETER- 1.4 in.
IGNITER- Percussion/Impact
FILLING- 1.5 oz.

The No. 24 Mk. II was officially introduced for service in May of 1918. It was declared obsolete on 29 July 1920.

The body differs from the Mk. I, it is made of cast iron and is smooth on the outside without any segmenting grooves. The bottom is somewhat rounded and has a threaded opening to accept the base piece. The base-piece is modified by the elimination of the head, instead the base-piece screws directly into the body. The top closing plug is formed of a die casting with a short tube fitted to support the central tube. In other respects it is similar to the Mk. I. The grenade can be fitted with either an 11" or 15 inch rod. With the use of the 15" rod the grenade is suitable for long range firing.

The filling may be Ammonal, Alumatol 2, Amatol 83/17, or Cilferite. The filling is loaded in paper containers which in later issues was coated with Pettman's cement. The detonator is the "Detonator, No. 24 Rifle Grenade, Mk. I [L].

The body is painted yellow or rust proofed. A red filling ring is painted around the top of the body and a second band denoting the type of filling is painted around the centre of the body. A green band denotes a filling of Amatol; a pink band means a filling of Ammonal or Alumatol. No band indicates a filling of Cilferite but the nature of the filling will be stenciled on the packing box. The designation is stamped into the closing plug as well as a manufacturers mark and date of manufacture.

No. 24 Mk. II
Photo - Ken Francis

Grenade, Rifle, No. 25 (Sangsters)

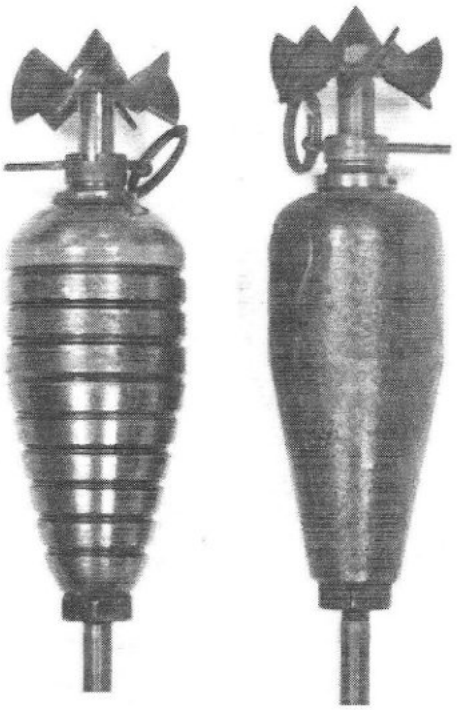
The No. 25 grenade, in either version, was never officially accepted for service. This does not necessarily mean that they were not used, at least for a short period of time. Trials were conducted in 1916-17, which may have included trials at the front.

Grenade, Rifle, No. 25 Mk. I

TYPE- Fragmentation
WEIGHT- 1 lb. 6 oz.
LENGTH- 5.2 in. w/o rod
4.0 in. body
DIAMETER- 1.9 in.
IGNITER- Percussion/Impact
FILLING- 2 oz.

The body is pear shaped, made of steel, and is serrated in one direction only. The base is internally threaded to accept an adapter, which is in turn threaded to accept the 15-inch launching rod. The head has a threaded hole to fit the igniter mechanism. The igniter consists of a detonator, primer, striker tube, creep spring, shear wire, and striker. The detonator and primer are mounted on the bottom end of the striker tube. Immediately above the detonator is the creep spring with the striker screwed into the tube above that. The striker is mounted with a propeller like wind vane. The shear wire passes through the tube and striker ensuring the striker does not screw down. A safety pin also fits through the striker holding it in the safe position.

The grenade has a filling of 2 ounces of Ammonal. The grenade is marked with a red filling ring and may have a pink coloured band to denote the filling of Ammonal.



Left - No. 25 Mk. I Right - No. 25 Mk. II
Photos - Norman Bonney

When the safety pin is removed and the grenade fired, the wind vanes cause the striker to rotate down into the grenade, as

the striker rotates it breaks the shear wire. The striker screws down until the threads disengage leaving the strike floating free, but held off the primer by the creep spring. Upon impact, the striker is driven down, overcoming the resistance of the spring and hitting the primer. The primer fires, flashes into the detonator and causes it to explode and so firing the main bursting charge.

Grenade, Rifle, No. 25 Mk. II

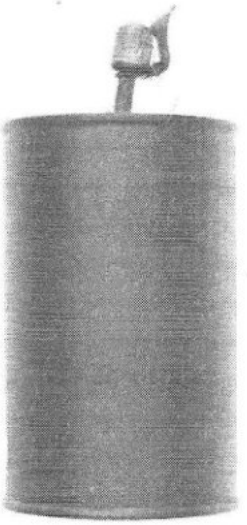
This model has changes to the body; it is made in the same shape but is of cast iron and does not have the external serration. The igniter mechanism is identical.

Grenade, Spring Gun, No. 26 Mk. I [L]

TYPE- Smoke, WP
WEIGHT- 1 lb. 8 oz.
LENGTH- 5.0 in.
DIAMETER- 3.0 in.
IGNITER- Brock Lighter
FUSE DELAY- 9 sec.
FILLING- 16.9 oz.

This grenade was designed for use with the spring gun. It was introduced for service on 23 October 1916 and officially declared obsolete on 8 March 1921 well after use had been discontinued.

The body consists of a tin cylinder with a closed copper sleeve soldered into the top cap. Two copper wires are soldered onto the projecting portion of the sleeve. The bottom of the body has an opening used to fill the grenade that is closed by a cover plate soldered into position after filling. The grenade is filled with Red Phosphorous. The burster/igniter consists of a length of safety fuze crimped onto a "Detonator, No. 8 Mk. VII. The open end of the safety fuze is covered by a bead of match head composition protected by a lead cap with a tear off tape. The length of fuze used gives a delay of 9 seconds.



No. 26 Mk. I
Photo - Norman Bonney

The body of the grenade is painted black with a red diamond painted on top. The "Mark", a manufacturers mark, and the date of manufacture are also marked on the top cover. The grenades are packed unfuzed in a wooden box containing 12 grenades. A cardboard box containing 12 igniters and one brassard is contained within the same wooden packing box. The packing boxes are painted green.

The grenade must be primed prior to use by inserting an igniter into the sleeve in the top of the grenade and securing it in position with the two copper wires. The grenade is ignited by tearing off the lead cap and rubbing the match head composition with the brassard. The ignited grenade is then placed in position on the spring gun and discharged.

Grenade, Hand or .303 inch Rifle, No 27

The No. 27 grenade was designed for its smoke effects but with the filling of White Phosphorous it also has a limited incendiary effect as well as an anti personnel effect. The Mk. I version was officially introduced for service on 12 December 1916 and declared obsolete on 8 January 1923.

Grenade, Hand or .303 inch rifle, No. 27 Mk. I [L]

WEIGHT- 1 lb. 3.5 oz. w/rod
LENGTH- 6.25 in. body
8.5 in. overall
DIAMETER- 2.25 in.
IGNITER- Adams mechanism
FUSE DELAY- 6.5 - 7 sec.
FILLING- 12.25 oz.

The main body of the grenade is a tinned steel cylinder with ends soldered on. The ends are in the shape of truncated cones. A steel washer with a threaded hole in the centre is soldered onto the base. A threaded spigot, made of sheet brass, is soldered to the top. A copper sleeve fits into the spigot and down into the body forming a detonator well. A felt wad is placed in the bottom of the sleeve to provide support for the detonator when the grenade is fired from a rifle. A filling hole is located in the upper end on the coned side. After filling a tin disc is soldered over the filling hole.

The striker mechanism screws onto the spigot. It consists of a brass tube with the upper portion reduced in diameter and the bottom threaded to match the threads on the spigot. There are several openings in the tube immediately above the

No. 27 Mk. I
Photo - Norman Bonney

threaded portion to allow gases formed by the burning fuse to escape. A brass striker fits into the reduced section projecting out the top of the tube. It is retained in position by a shear wire that passes through both the striker and tube. The striker mechanism is protected in transit by a tight fitting brass cap that fits over far enough to cover the openings. A safety pin passes through the cap and tube just below the end of the striker. In later issues the safety pin passes through the cap, tube and striker. A 15-inch rod screws into the bottom washer allowing the grenade to be discharged from a rifle.

The "Burster, No. 27 Phosphorous Grenade, Mark I [L]" consists of a cartridge and detonator connected by a length of safety fuze. A cut down Eley .410 sporting cartridge is secured in a cup shaped holder that is fitted with an inner holder to secure the safety fuse. The inner holder has inward projecting tongues that press into the fuze holding it in position. Four holes are drilled through the holders after assembly to provide an escape for the gases from the burning fuse. A paper collar fits over the holder and is waterproofed to prevent the entry of moisture through the holes. The safety fuse is 2.47 inches long providing a delay of about six seconds. A No. 6 Mk. I detonator is crimped onto the open end of the fuse.

The "Burster, No. 27 Phosphorous Grenade, Mk. II [L]" differs from the Mk. I in that it is fitted with the No. 3 Mk. I detonator. This detonator is shorter than the No. 6 Mk. I so the felt wad in the detonator sleeve is slightly thicker when this burster is used.

The grenade is painted black with a half inch red band painted around the upper half of the main body. The designation, a manufacturers mark, and the date of manufacture are stamped into the washer on the bottom of the grenade. The grenades and components are issued separately. Twelve grenades are packed in a wooden box (G27), painted light green. The bursters are packed 12 in a tin cylinder, which is painted red. Twelve cylinders are then packed in a wooden box, painted yellow with a light green disc painted on each end. The launching rods and cartridges are issued together and are packed in wooden boxes containing 48 of each.

The grenade is prepared for use by removing the striker mechanism and inserting a burster. The holder rests on top of the spigot. The striker mechanism is replaced and screwed down hand tight. If the grenade is to be discharged from a rifle a launching rod is then screwed on. The safety pin and cap are removed just prior to firing the rifle, the setback shock of firing causes the striker to overcome the resistance of the shear wire and allow the striker to hit the primer. If thrown by hand, the rod is dispensed with, the safety pin and cap removed, and the striker struck on any convenient hard object and the grenade immediately thrown. The striker hits the primer causing it to fire and flash into the fuse. The fuse ignites, burns down to the detonator, and causes the detonator to fire. The explosion of the detonator is sufficient to burst the body and scatter the phosphorous. The phosphorous ignites on contact with air and burns producing a heavy white smoke.

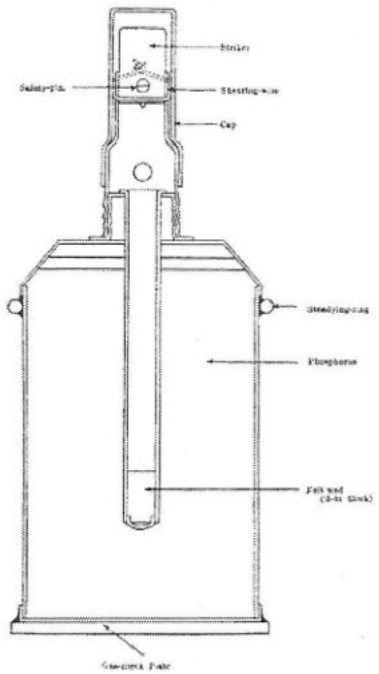
Grenade, Hand or .303 inch Rifle, No. 27 Mk. I Drill

This is a No. 27 Mk. I grenade without filling. In other respects the grenade is the same as the live version. It is identified by being painted white and may have the word "DRILL" stenciled in black on the side of the body. In addition the filling hole is not closed.

Grenade, Hand or .303 inch rifle, No. 27 Mk. II [L]

TYPE- Smoke, WP
WEIGHT- 1 lb. 4 oz.
LENGTH- 6.3 in.
DIAMETER- 2.25 in.
FUSE DELAY- 6.5 - 7 sec.
FILLING- 12 oz.

The Mk. II version was designed for use with the 2.5 inch discharger cup. The body is modified to have a flat base with a steel gas check plate soldered to the bottom. A wire ring soldered around the upper portion of the body to provide a riding surface for the cup discharger. A threaded spigot, made of sheet brass, is soldered to the top. A copper sleeve fits into the spigot and down into the body forming a detonator well. A felt wad, .5 inch thick, is placed in the bottom of the sleeve to provide support for the detonator when the grenade is fired from a rifle. A filling hole is located on the upper cone. After filling a tin disc is soldered over the filling hole to close it and provide an airtight seal.



No. 27 Mk. II

The striker mechanism screws onto the spigot. It consists of a brass tube with the upper portion reduced in diameter and the bottom threaded to match the threads on the spigot. There are several openings in the tube immediately above the threaded portion to allow gases formed by the burning fuse to escape. A brass striker fits into the reduced section projecting out the top of the tube. It is retained in position by a shear wire that passes through both the striker and tube. The striker mechanism is protected in transit by a tight fitting brass cap that fits over far enough to cover the openings. A safety pin passes through the cap and tube just below the end of the striker. In later issues the safety pin passes through the cap, tube and striker. A 15-inch rod screws into the bottom washer allowing the grenade to be discharged from a rifle.

The "Burster, No. 27 Phosphorous Grenade, Mark I [L]" consists of a cartridge and detonator connected by a length of safety fuze. A cut down Eley .410 sporting cartridge is secured in a cup shaped holder that is fitted with an inner holder to secure the safety fuse. The inner holder has inward projecting tongues that press into the fuze holding it in position. Four holes are drilled through the holders after assembly to provide an escape for the gases from the burning fuse. A paper collar fits over the holder and is waterproofed to prevent the entry of moisture through the holes. The safety fuse is 2.47 inches long providing a delay of about six seconds. A No. 3 Mk. I detonator is crimped onto the open end of the fuse.

The grenade is painted black with a half inch red band painted around the upper half of the main body. The grenades and components are issued separately. Twelve grenades are packed in a wooden box (G27), painted light green. The bursters are packed, 12 in a tin cylinder that is painted red. Twelve cylinders are then packed in a wooden box, painted yellow with a light green disc painted on each end.

The grenade is prepared for use by removing the striker mechanism and inserting a burster, the holder of the burster resting on top of the spigot. The striker mechanism is then replaced and screwed down hand tight. The safety pin and cap are removed just prior to firing the rifle, the setback shock of firing causes the striker to overcome the resistance of the shear wire and allow the striker to hit the primer. If the grenade is to be used by hand, the safety pin and cap are removed; the striker pellet sharply hit on a convenient hard object and the grenade thrown immediately. The act of hitting the striker on a hard object is enough to break the shear wire and allow the striker to hit the primer and ignite the grenade.

Grenade, Spring-Gun or Hand No. 28

This gas grenade was designed to be fired from the Spring-Gun or thrown by hand. It was officially introduced for service in February of 1917 and not declared obsolete until 19 January 1931.

Grenade, Spring-Gun or Hand, No. 28 Chemical Mk. I [L]

TYPE- Gas WEIGHT- 2.0 lb. LENGTH- 4.0 in. DIAMETER- 3.3 in. FUSE DELAY- 5 sec. FILLING- 6.6 fl oz.

The body consists of a round cast iron container with a large, threaded, opening in the top. A cast iron detonator sleeve that protrudes deeply into the body and acts as a holder for the detonator closes the opening. A squared projection on top provides a means of tightening the sleeve. A copper wire attached through a hole in a web on top provides a means of securing the detonator assembly. The detonator assembly is the same as that used on the No. 15 grenade. It consists of a length of safety fuze crimped onto a "Detonator, No. 8 Mk. VII. The open end of the safety fuze is covered by a bead of match head composition that is then protected by a lead cap with a tear off tape. The length of fuze used gives a delay of 9 seconds.

The filling is introduced through the opening and sealed in by the detonator sleeve.

No. 28 Mk. I
Photo - Norman Bonney

When filled, an air space is left to allow room for expansion. The filling may be "KJ" (Stannic Chloride) or "KSK" (100% Ethyl Iodacetate. Both fillings are a tear gas, which is intensely irritating to the eyes and respiratory tract causing involuntary tearing and violent coughing.

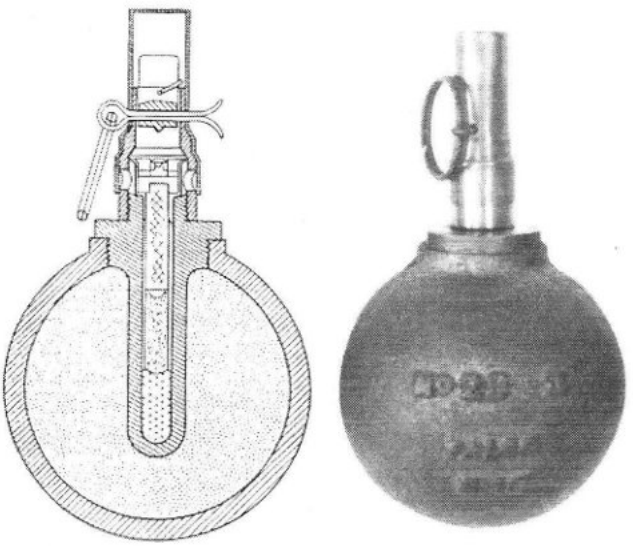
The grenade is marked by a grey painted body with a red filling ring around the top and if filled with "KJ" a 1.5 inch red square painted on the body. The designation, a manufacturers mark and date of manufacture are cast into the side of the body. They are packed in wooden boxes containing 12 grenades and a tin box holding 12 detonator assemblies and two brassards. The tin with the detonator assemblies is painted red with a green cap.

For use the grenade must be primed by first inserting the detonator assembly then securing it using the copper wires attached to the grenade. For hand use, tear off the tape to expose the match head composition, strike with the brassard, and throw the grenade. For use with the West spring-gun or Leach catapult, the grenade is first placed in positon then ignited as for hand use. The spring-gun or catapult is then fired, sending the grenade on its way.

Grenade, Spring-Gun or Hand, No. 28 Chemical, Mk. II [L]

TYPE- Gas
WEIGHT- 2.0 lb.
LENGTH- 4.0 in. w/o igniter
DIAMETER- 3.3 in.
IGNITER- Percussion
FUSE DELAY- 12 sec.
FILLING- 6.6 fl oz.

The main body is the same as the Mk. I but modifications are made in the detonator sleeve. The sleeve is provided with an externally threaded spigot instead of the squared projection. Flats are formed on the head of the sleeve to provide a means of tightening the sleeve.



No. 28 Mk. II
Photo - Norman Bonney

The igniter is constructed of a striker mechanism and burster. The striker mechanism consists of a brass tube with the upper portion reduced in diameter and the bottom threaded to match the threads on the spigot. There are several openings in the tube immediately above the threaded portion to allow gases formed by the burning fuse to escape. A brass striker fits into the reduced section projecting out the top of the tube. It is retained in position by a shear wire that passes through both the striker and tube. The striker mechanism is protected in transit by a tight fitting brass cap that fits over far enough to cover the openings. A safety pin passes through the cap, tube and striker. The "Burster, Nos. 28 and 29 chemical grenades, Mk. I [L]" is similar to that of the No. 27 grenade but has a greater length of No. 15A safety fuze to give a burning time of 12 seconds. In addition a larger, No. 8 large, detonator is used.

The grenade may have a filling of "KJ" (Stannic Chloride), "KSK" (100% Ethyl Iodoacetate), "SK" (75% Ethyl Iodoacetate and 25% alcohol), or "MSK" (Methyliodoacetate). All of the fillings are of the tear gas type, intensely irritating to the eyes and respiratory tract causing involuntary tearing and violent coughing.

The grenade has a grey body with a red filling ring around the top of the detonator sleeve and if filled with "KJ" a red square painted on the side of the body. The designation, a manufacturers mark, and the date of manufacture are cast into the side of the body. The grenades are packed in wooden boxes containing 12 grenades and a tin containing 12 bursters and a spanner for the striker mechanism. The box is painted light green and the tin painted red with a green cap.

The grenade is prepared for use by removing the striker mechanism and inserting a burster, the holder of the burster resting on top of the spigot. The striker mechanism is then replaced and screwed down and tightened with the spanner. If thrown by hand, the safety pin and cap are removed, and the striker struck on any convenient hard object and the grenade immediately thrown. The striker hits the primer causing it to fire and flash into the fuse. The fuse ignites, burns down to the detonator, and causes the detonator to fire.

Grenade, Spring-Gun or Hand, No. 28 Chemical, Mk. III

This was an experimental grenade developed in 1921. The grenade was limited to trials at the Chemical Defence Establishment, Porton Down and was not adopted for service.

Special Note:
Documents obtained from Canadian Archives and dated 8/10/16 report on a "White Star" grenade. This grenade was described as being of the same type as the "MSK" grenade, consisting of a hollow cast iron sphere. I believe it was the No. 28 Mk. I grenade.

It was noted that the grenades were supplied in boxes containing 24 grenades and a tin containing the fuzed detonators and four brassards. The detonator was fastened in position by winding the copper wires firmly around its neck. This grenade was provided with detonator assemblies with a 5 second delay. The grenades were marked with a White band.

"White Star" was a mixture of 50 % chlorine and 50% phosgene, which, on explosion of the grenade produced a cloud of heavy white lethal gas with an unpleasant odor.

The documents go on to say that the grenades were effective for clearing dugouts. One bomb being sufficient for small dugouts if the bomb is thrown well into the dugout, not near the entrance. For larger dugouts one bomb in each entrance would suffice. One bomb was immediately effective in at least 1000 cubic feet of air. Apparently, after one hour had expired, the dugouts would be safe for unprotected men to enter.

It is unknown if these grenades were ever used in the trenches, but I believe they were developed and tested for use. This is the only document I have found that mentions a lethal gas grenade being developed by the British.

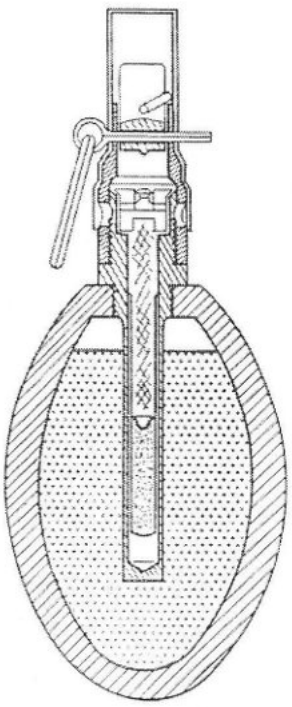
Grenade, Spring-Gun or Hand, No. 29

This is basically a smaller version of the No. 28 Mk. II. It holds about half the amount of filler and is oval in shape making it more easily used by hand. It was officially introduced for service on 1 September 1917.

Grenade, Spring-Gun or Hand, No. 29 Chemical, Mk. I [L]

TYPE- Gas
WEIGHT- 1 lb. 12 oz.
LENGTH- 6.2 in. overall
3.6 in. body
DIAMETER- 2.4 in.
IGNITER- Percussion
FILLING- 3.2 fl oz.

The body is made of cast iron in an oval shape. A hole in top is threaded to accept a mild steel detonator holder. The detonator holder acts not only as a detonator sleeve but also as a closing plug ensuring the filling is not exposed to the air. The detonator has an externally threaded spigot on top, threaded to match the threading of the igniter assembly. The same igniter assembly used in the No. 28 Mk. II is used in this grenade. The striker mechanism consists of a brass tube with the upper portion reduced in diameter and the bottom threaded to match the threads on the spigot. There are several openings in the tube immediately above the threaded portion to allow gases formed by the burning fuse to escape. A brass striker fits into the reduced section projecting out the top of the tube. It is retained in position by a shear wire that passes through both the striker and tube. The striker mechanism is protected in transit by a tight fitting brass cap that fits over far enough to cover the openings. A safety pin passes through the cap, tube and striker. The "Burster, Nos. 28 and 29 Chemical Grenades, Mk. I [L]" has a length of No. 15A safety fuze cut to give a burning time of 12 seconds and uses a "No. 8 Large" detonator.



The filling consists of approximately 95 cc of "KJ" (Stannic Chloride), "KSK" (100% Ethyl Iodoacetate), "SK" (75% Ethyl Iodoacetate and 25% alcohol), or "MSK" (Methyliodoacetate). The body is painted grey with a red filling ring around the top. If filled with "KJ" a red painted square is painted on the body.

The grenade is prepared for use by removing the striker mechanism and inserting a burster with the holder of the burster resting on top of the spigot. The striker mechanism is then replaced, screwed down and tightened with the spanner. If thrown by hand, the safety pin and cap are removed, and the striker struck on any convenient hard object and the grenade immediately thrown. The striker hits the primer causing it to fire and flash into the fuse. The fuse ignites, burns down to the detonator, and causes the detonator to fire.

Grenade, Spring-Gun or Hand, No. 29 Chemical, Mk. II [L]

The only difference between the Mk. II and the Mk. I is in the detonator holder. In the Mk. II it is made of cast iron. The two grenades are exactly the same in all other respects.

Grenade, Hand and Rifle, No. 30

Originally trialed as the Humphries Pattern (or Woolwich No. 2 grenade) grenade it had a much different appearance to the final No. 30. The Humphries was spherical with the fuze mounted centrally within the body. The safety bolt was held in by a weighted tape wound around the body. Humphries who worked at Woolwich Arsenal designed the fuze mechanism. The developed No. 30 was not adopted for service but was used in troop trials during 1917-1918. After the troop trials, the grenade was modified and became known as the CSOF (Chief Superintendent of Ordnance Factories) pattern. In 1918 the CSOF grenade competed with a number of other designs but the end of the war caused the tests to come to a rapid end. The ordnance factory further developed the CSOF grenade that ultimately became the No. 54.

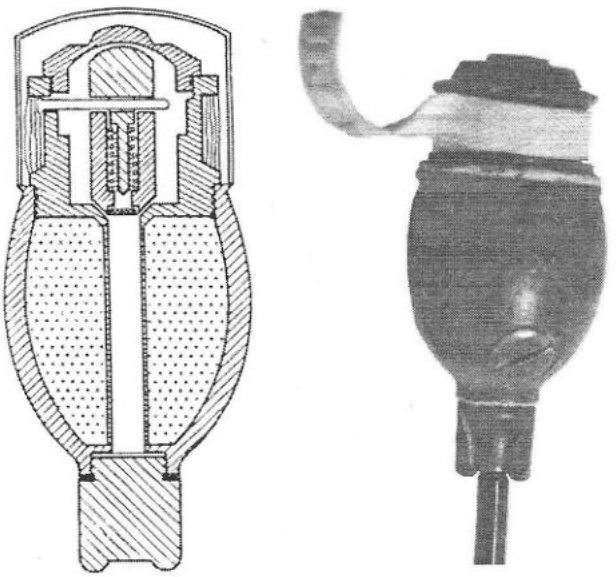
Humphries Pattern

Grenade, Hand or Rifle, No. 30 Mk. I

TYPE- Fragmentation
WEIGHT- 1 lb. 3.5 oz.
LENGTH- 3.4 in. w/o rod
2.25 in. body
DIAMETER- 1.9 in.
IGNITER- Allways, Impact
FILLING- 1.25 oz.

The body is constructed of cast iron in an oval shape. A filling hole is located near the bottom of the body and is closed by a threaded plug. A threaded hole in the base is closed by a base plug and felt washer. The base plug has a type of "wing nut" appearance and has a felt disc cemented onto the end. The base plug is centrally bored and threaded to accept a launching rod. The launching rod specified is a 5.75 inch rod, however examples have been noted with a 10" rod. The grenade is fitted with an "Allways" type fuze mechanism that is covered by a transit cap made of a light alloy.

The fuze mechanism is the basis from which the No. 247 fuze mechanism was developed. It consists of a body, a cap holder, a weighted striker and spring, and a safety pin. The main body is threaded to match screw threads inside the top of the main grenade body and has a detonator sleeve mounted on the bottom extending down into the grenade body. The cap holder fits loosely inside the main fuze body and has a percussion cap mounted in the bottom. The bottom of the cap holder is slightly tapered to fit into a corresponding chamfer at the top of the detonator sleeve. The weighted striker is in one piece with a larger rounded head and a stem turned down to fit into the cap holder. A striker spring fits over the striker and holds the striker away from the percussion cap. The safety pin fits through a hole in the side of the body and through a hole in the striker just below the head. When fitted the safety pin fits through the striker above the cap holder and provides a positive safety by preventing the striker from entering the cap holder far enough to hit the percussion cap. The safety pin is attached to a tape with a weight on the opposite end. When the safety pin is in place,



No. 30 Mk. I
Photo - Bob Perkins

the tape is wrapped around the body holding the pin in place. The transit cap prevents the tape from unraveling while in place. The internal parts of the fuze mechanism are held in by a threaded cap that screws into the top of the fuze body. The cap has a cone shaped indentation on the inside.

The grenade is painted yellow ochre with a quarter inch red filling ring around the top of the body, a half inch band denotes the filling, pink for Ammonal or Alumatol 2 and green for Amatol 80/20. The top of the safety cap is marked with the designation and a manufacturers mark. There is a red oval painted on the side of the cap that corresponds with a red painted "SAFE" on the body. When aligned they indicate the cap is in the safe position (locked on). Other examples have been noted painted black with a red band.

For use the grenade must first be primed by removing the base plug, inserting a detonator with the open end up, and replacing the base plug. The felt disc cemented onto the base plug cushions the detonator. For hand use the launching rod is discarded. The transit cap would be removed and the tape prevented from unraveling by holding it with the thumb of the throwing hand. When the grenade is thrown, the weight on the tape causes it to unravel and pull out the safety pin. When the grenade lands the weighted striker overcomes the resistance of the striker spring and allows the point of the striker to hit the percussion cap that flashes into the detonator and causes the grenade to explode. The rounded top of the striker and the cone shaped indentation in the closing cap ensure the striker will be driven into the percussion cap. When the grenade lands, the striker and cap holder being loose in the body can move, any movement sideways force the striker down through the action of the striker head moving on the cone shaped indentation in the cap. For use as a rifle grenade, the launching rod is placed in the barrel of the rifle and the rifle loaded with a launching cartridge. The transit cap is removed and the rifle fired. After this point the grenade acts in the normal manner.

Grenade, Rifle, No. 31, Daylight Signal

The grenade was officially adopted for service in May 1918 well after it had actually been in the hands of the troops. The final versions of the grenade stayed on inventory with the Royal Navy until they were declared obsolete on 8 August 1956. This grenade was used for signaling during daylight using a smoke candle.

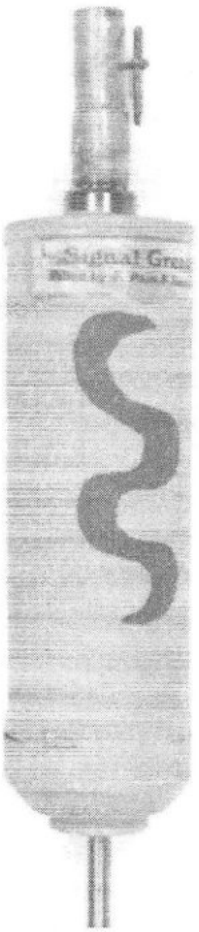
Grenade, Rifle, No. 31 Mk. 1[L]

TYPE- Signal, Daylight
LENGTH- 7 7/8 in. w/o igniter
DIAMETER- 2.25 in.
IGNITER- Adams mechanism
FUSE DELAY- 2.5 - 3 sec.

The main body is a cylindrical tin case formed in two parts and which are attached together in the centre by a bayonet type joint. The base is closed by a flat cap with a steel base plate soldered on. The base plate has a central threaded hole to accept the 15 inch launching rod. The cap is not soldered on; it is retained in place by its tight fit. The top is closed by a cap that has a threaded spigot soldered on. The spigot is threaded to match the threading of the striker mechanism which is identical to that used on the No. 27 grenade. It consists of a brass tube with the upper portion reduced in diameter and the bottom threaded to match the threads on the spigot. There are several openings in the tube immediately above the threaded portion to allow gases formed by the burning fuse to escape. A brass striker fits into the reduced section projecting out the top of the tube. It is retained in position by a shear wire that passes through both the striker and tube. The striker mechanism is protected in transit by a tight fitting brass cap that fits over far enough to cover the openings. A safety pin passes through the cap, tube and striker.

The lower portion of the body contains a parachute of Japanese paper folded and packed to ensure its opening when discharged. The upper portion of the body contains the smoke candle primed by quickmatch and an expelling charge consisting of fine grain gunpowder. The smoke candle may produce either red, blue, yellow, or green smoke.

The "Igniter, Nos. 31 and 32 signal grenades, Mk. 1[L]" consists of a cut down Eley .410 cartridge case which is secured to a length of No. 11 or No. 14 safety fuze. The first issues had a length of 1 inch and later issues a length of 1.15 inch to give a delay of 3 seconds.



No. 31 Mk. II
Photo - Norman Bonney

The grenade is painted buff with a serpentine painted in the colour of the signal. A pasted paper label give the designation and filling station. The grenades are packed in wooden boxes containing 12 grenades, a tin containing 12 igniters, 12 launching rods and a tin box containing 12 launching cartridges.

For use, the grenade must first be primed by unscrewing the striker mechanism, inserting an igniter, and replacing the striker mechanism. The grenade is then mounted on the rifle by inserting the launching rod in the barrel of the rifle. The rifle is loaded with a launching cartridge. As the grenade is about to be fired, the safety pin and cap are removed. The rifle is then fired launching the grenade. The setback caused by firing causes the striker to break the shear wire, hit the primer and ignite the safety fuze. The safety fuze burns for three seconds and ignites both the quickmatch and expelling charge. Explosion of the expelling charge blows off the base and pushes the ignited smoke candle and parachute out of the casing. The parachute deploys and supports the smoke candle in the air.

Grenade, Rifle, No. 31 Mk. II[L]

TYPE- Signal, Daylight
LENGTH- 7 7/8 in. w/o igniter
DIAMETER- 2.25 in.
IGNITER- Adams mechanism
FUSE DELAY- 2.5 - 3 sec.

The Mark II differs from the Mk. I only in the construction of the body. In the Mk. II the body is constructed in one piece, eliminating the bayonet joint in the centre of the body casing. In addition a tin strip is soldered around the body at the point where the base cap ends providing a stronger surface to withstand the shock of firing. A short tube is soldered to the inside of the base cap to wrap the parachute around. The base cap has a chamfered edge. The smoke candle may be either red, blue, yellow, or purple. The body is painted khaki with a serpentine in the colour of the smoke candle.

Grenade, Rifle, No. 31 Mk. III [L]

TYPE- Signal, Daylight
LENGTH- 7 7/8 in. w/o igniter
DIAMETER- 2.25 in.
IGNITER- Adams mechanism
FUSE DELAY- 2.5 - 3 sec.

This version is as for the Mk. II but has some minor changes in construction to simplify manufacture.

The smoke candle may be either red, blue, yellow, or purple. The body is painted khaki and is marked with a serpentine in the colour of the smoke candle.

Grenade, Rifle, No. 31 Mk. IV[N]

This Mark was introduced for naval service only in June 1930. It was produced in four colours, red, yellow, purple, and blue. The smoke candle differed in its form but it is unknown at this point what those differences are.

Grenade, .303 inch Rifle, Night Signal, No. 32

This grenade was developed in parallel with the No. 31 to provide a means of signaling by night. It was officially introduced for service in May 1918, well after it was in use at the front. Although there are no records of its use after 1935 this grenade was not declared obsolete until August 1956.

Grenade, .303 inch Rifle, No. 32 Mk. I [L]

TYPE- Signal, Night
LENGTH- 7 7/8 in. w/o igniter
DIAMETER- 2.25 in.
IGNITER- Adams mechanism
FUSE DELAY- 2.5 - 3 sec.

The main body is a cylindrical tin case formed in two parts and which are attached together in the centre by a bayonet type joint. The base is closed by a flat cap with a steel base plate soldered on. The base plate has a central threaded hole to accept the 15 inch launching rod. The cap is not soldered on; it is retained in place by its tight fit. The top is closed by a cap with a threaded spigot soldered on. The spigot is threaded to match the threading of the striker mechanism which is identical to that used on the No. 27 grenade. It consists of a brass tube with the upper portion reduced in diameter and the bottom threaded to match the threads on the spigot. There are several openings in the tube immediately above the threaded portion to allow gases formed by the burning fuse to escape. A brass striker fits into the reduced section projecting out the top of the tube. It is retained in position by a shear wire that passes through both the striker and tube. The striker mechanism is protected in transit by a tight fitting brass cap that fits over far enough to cover

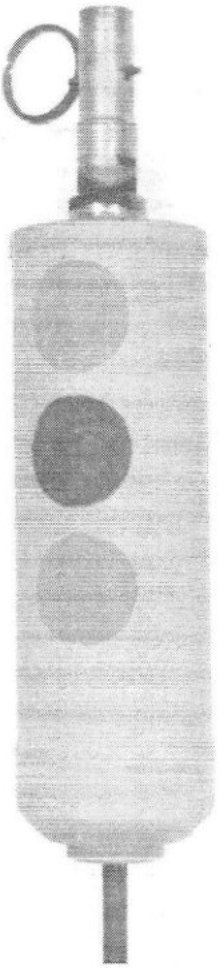
the openings. A safety pin passes through the cap, tube and striker.

The lower portion of the body contains a parachute of Japanese paper folded and packed to ensure it's opening when discharged. The upper portion of the body contains two or more coloured stars primed by quickmatch and an expelling charge consisting of fine grain gunpowder. The stars are tethered together at 12 foot intervals on asbestos string.

The "Igniter, Nos. 31 and 32 signal grenades, Mk. 1[L]" consists of a cut down Eley .410 cartridge case which is secured to a length of No. 11 or No. 14 safety fuze. The first issues had a length of 1 inch and later issues a length of 1.15 inch to give a delay of 3 seconds.

The grenades are packed in wooden boxes containing 12 grenades, a tin containing 12 igniters, 12 launching rods and a tin box containing 12 launching cartridges. The body is painted khaki and has coloured discs painted on its side corresponding to the colour and sequence of the stars.

For use, the grenade must first be primed by unscrewing the striker mechanism, inserting an igniter, and replacing the striker mechanism. The grenade is then mounted on the rifle by inserting the launching rod in the barrel of the rifle. The rifle is loaded with a launching cartridge. As the grenade is about to be fired, the safety pin and cap are removed. The rifle is then fired launching the grenade. The setback caused by firing causes the striker to break the shear wire, hit the primer and ignite the safety fuze. The safety fuze burns for three seconds and ignites both the quickmatch and expelling charge. Explosion of the expelling charge blows off the base and pushes the ignited signal stars and parachute out of the casing.



No. 32 Mk. II
Photo - Norman Bonney

Grenade, .303 inch Rifle, No. 32 Mk. II [L]

TYPE- Signal, Night
LENGTH- 7 7/8 in. w/o igniter
DIAMETER- 2.25 in.
IGNITER- Adams mechanism
FUSE DELAY- 2.5 - 3 sec.

The Mark II differs from the Mk. I only in the construction of the body. The body is constructed in one piece, eliminating the bayonet joint in the centre of the body casing. In addition a tin strip is soldered around the body at the point where the new style, dished, base cap ends providing a stronger surface to withstand the shock of firing. A short tube is soldered to the inside of the base cap to wrap the parachute around. The body is painted khaki with coloured discs painted on the side that correspond to the number, sequence, and colour of stars.

Grenade, .303 inch Rifle, No. 32 Mk. III [C]

TYPE- Signal, Night
LENGTH- 7 7/8 in. w/o igniter
DIAMETER- 2.25 in.
IGNITER- Adams mechanism
FUSE DELAY- 2.5 - 3 sec.

The Mk. III is constructed much like the Mk. II but has some minor changes in construction to ease manufacture. The markings are as for the Mk. II. Use of the Mk, III was extended to Naval service in WOLC on 26 June 1930.

Grenade, Hand, No. 33

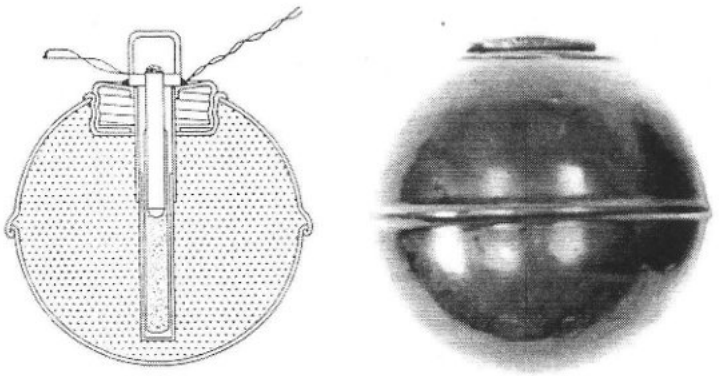
This grenade was used for instructional purposes. It was also known as the "Spherical E Type". The Mark I version was officially introduced for service in May 1919 but was actually in service as early as 1915. It was declared obsolete on 29 July 1920.

Grenade, Hand, No. 33 Mk. I [L]

The body is constructed of tin plate in a spherical shape. The body is manufactured in two parts a top and a bottom that

TYPE- Offensive
WEIGHT- 7.25 oz
LENGTH- 3.0 in.
DIAMETER- 3.0 in.
IGNITER- Brock lighter
FILLING- 4 oz.

are then joined in the middle by double wrapping and soldering the joint. The bottom is simply a hemisphere. The top has an opening on top which has a shallow screw threaded socket soldered in. The socket is threaded to receive the igniter holder and a hole in the bottom to allow filling of the grenade body.



No33 Mk. I
Photo - Norman Bonney

The igniter holder is constructed of a screw threaded ring, a disc, a sleeve, and a copper detonator holder. The ring is flanged on the lower end and has the top closed by the disc that is soldered onto it. The edge of the disc is milled to provide a surface that may be grasped to screw the assembly in. The sleeve is soldered into an opening in the centre of the disc and the copper detonator sleeve is in turn soldered to the sleeve. A length of copper wire is soldered to the top of the sleeve.

The igniter as issued with this grenade is identical to that issued with the Grenade, Hand, No. 15 Mk. I. The igniter consists of a length of safety fuze crimped onto a "Detonator, No. 8 Mk. VII. The open end of the safety fuze is covered by a bead of match head composition that is then protected by a lead cap with a tear off tape. The length of fuze used gives a delay of 9 seconds. The igniter is fastened into the grenade by the copper wire attached to the sleeve.

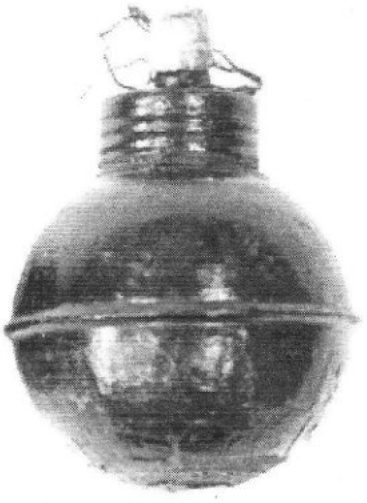
The grenade is painted black and is marked on the top disc with the designation, a manufacturers mark, and the date of manufacture. A .25-inch red filling ring is painted around the top just below the socket and a .50-inch ring is painted around the centre to denote the type of filling. A green band denotes a filling of Amatol 80/20 and a pink band denotes Ammonal. It is also noted that the grenade may be filled with a weak lachrymatory for use in training.

For use, the lead cap is torn off by use of the tear off tape exposing the match head composition. The fuze is ignited by a brassard worn by the thrower.

Grenade, Hand, No. 33 Mk. II [L]

TYPE- Offensive
WEIGHT- 7.25 oz.
LENGTH- 3.0 in. body
DIAMETER- 3.0 in.
FILLING- 4 oz.

This is an improvement on the Mark I version to make it easier to produce. The grenade is constructed in basically the same manner except the socket protrudes from the body in this model. The cap is also modified to fit over the socket instead of inside. This makes the grenade easier to waterproof and eases the production. In other respects the grenade is the same as the Mark I.



No. 33 Mk. II
Photo - Norman Bonney

The grenade is marked on the top cap with the designation and a manufacturers mark. A .25 inch red filling ring is painted around the top just below the socket and a .50 inch ring is painted around the centre to denote the type of filling. A green band denotes a filling of Amatol 80/20 and a pink band denotes Ammonal. This grenade could also be filled with Hillite for which there appears to be no special marking.

Grenade, Hand, No. 34

This grenade was first officially introduced for service in February 1918 but was

actually in use in early 1917. The Mk. 1 was introduced in February 1918 and declared obsolete on 29 July 1920, the Mk. 2 introduced February 1918 and obsolete on 29 July 1920. The Mk. 3 was introduced in March 1918 and declared obsolete on 8 March 1920 and finally the Mk. 4 was introduced in November 1918 and declared obsolete on 8 March 1920.

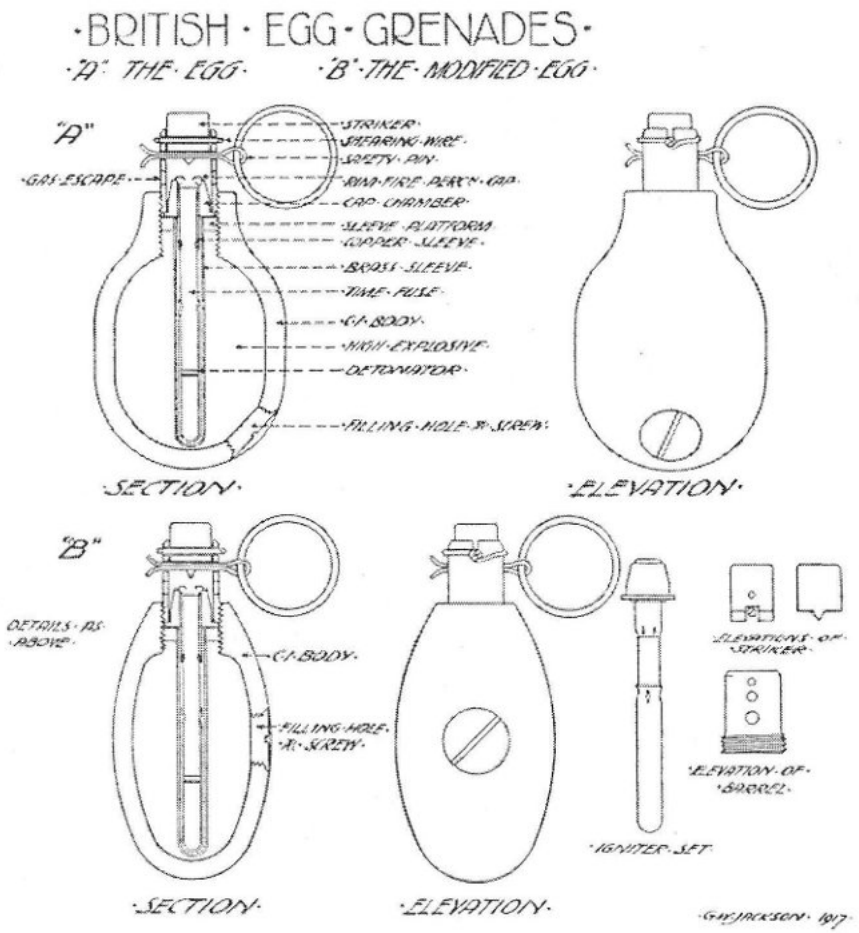
Grenade, Hand, No. 34 Mk. I [L]

TYPE- Fragmentation
WEIGHT- 12 oz.
LENGTH- 3.9 in.
DIAMETER- 1.9 in.
IGNITER- Percussion
FUSE DELAY- 5 sec.
FILLING- 1.25 oz.

The body is constructed of cast iron in an egg shape. The top of the body is internally threaded to accept a detonator sleeve and another opening in the side of the body is threaded to accept the filling hole plug. The detonator sleeve screws into the top hole of the body and consists of a brass or copper sleeve soldered into a steel collar. The collar is provided with holes to take a key for turning the sleeve into the body. The threads are coated with Pettmans cement to seal the joint.

No. 34 Mk. I
Photo-Norman Bonney

The striker mechanism fits into the top of the grenade above the detonator sleeve. The striker mechanism consists of a striker holder made of tubular steel and a striker. The striker is held in place with its end projecting above the holder by a spring ring that fits into grooves in the striker and holder. The striker is held safe by a split pin passing through both the striker and holder. A steel ring attached to the split pin provides an easy method of removing it and passes over the top of the striker during transit ensuring it holds the pin in place. The striker is formed with a striker edge across the face of the striker to engage the rimfire cap in the detonator assembly. Deep notches in the striker allow the gases formed by the burning fuze to escape. A detonator assembly, "Detonator, No. 34 grenade, Marks I and II" fits into the detonator sleeve below the striker mechanism. The detonator assembly consists of a percussion cap, cap holder, length of safety fuze, and detonator.



Drawing of the No. 34 grenades, showing the Mk. I on top and Mk. III below.
The drawings were done by G.W. Jackson in 1917.

The filling is Alumatol 2. After filling the grenade is marked with a red filling ring around the neck of the body and a pink band around the centre denoting a filling of Alumatol. The body is marked with designation, manufacturers mark, and date of manufacture. The grenades were normally packed 24 to a wooden box that also contained a tin containing 26 detonator assemblies. A spanner for the striker socket is also contained within the wooden box.

For use the grenade must first be primed. The striker holder is removed

and a detonator assembly inserted. The striker holder is then replaced and screwed tightly down on the flange of the cap holder. After priming the grenade is ready for use. When ready to throw the grenade, remove the safety pin and hit the striker a sharp blow on something hard. The striker causes the percussion cap to fire and ignite the safety fuze, throw the grenade immediately. The grenade will explode after a delay of 5 to 7 seconds.

Grenade, Hand, No. 34 Mk. II [L]

TYPE- Fragmentation
WEIGHT- 12 oz.
LENGTH- 3.9 in.
DIAMETER- 1.9 in.
IGNITER- Percussion
FUSE DELAY- 7 sec.
FILLING- 1.25 oz.

The Mk. II version uses the same body as the Mk. I. In fact the only difference in the two Marks is in the striker mechanism. All other descriptions are as for the Mk. I.

The Mark II striker mechanism is constructed much the same as the Mark I, the difference being in the method of holding the striker back on removal of the safety pin. The striker mechanism consists of a striker holder made of tubular brass and a solid striker. The striker is formed with a striking edge across the face of the striker to engage the rimfire cap in the detonator assembly. Deep notches in the striker allow the gases formed by the burning fuze to escape. The striker is held in place with its end projecting above the holder by a shear wire fitting through holes in the striker holder and a corresponding hole in the striker itself. The striker is held safe by a split pin passing through both the striker and holder. A steel ring attached to the split pin provides an easy method of removing it as well as passing over the top of the striker during transit holding the pin in place.

No. 34 Mk. II
Photo - Norman Bonney

The body is marked with the designation, manufacturers mark, and date of manufacture. A 1/2" red filling ring is painted around the neck of the body and a 1/2" pink band around the middle denoting a filling of Alumatol 2.

Grenade, Hand, No. 34 Mk. III [L]

TYPE- Fragmentation
WEIGHT- 11 oz.
LENGTH- 4.0 in.
DIAMETER- 1.625 in.
IGNITER- Percussion
FUSE DELAY- 5 sec.
FILLING- 1 oz.

The body of the No. 34 Mk. III is more egg shaped than that of the Mk. I or Mk. II. The filling hole is moved up on the body to a more central point and closed by a filling plug. The head of the detonator sleeve is made of a die casting instead of a steel collar. The striker mechanism is the same as used on the Mk. II grenade but the detonator assembly is somewhat different.

The grenade is marked on the body with the designation, a manufacturers mark, and the date of manufacture. Painted markings consist of a 1/2" red ring around the top, denoting a filled grenade, and a 1/2" pink band around the centre denoting a filling of Alumatol or Ammonal.

No. 34 Mk. III

Grenade, Hand, No. 34M Mk. III [L]

This is simply a No. 34 Mk. III with fillings more suitable for use in tropical climates. The fillings used are Trotyl or Baratol 20/80. With use of the different fillings the painted markings were changed to a ring of red "X's" to denote the suitability for use in tropical climates and a green band denoting the filling of Trotyl or Baratol. The body is still marked with the designation, a manufacturers mark, and date of manufacture. In this case the designation does not include the "M".

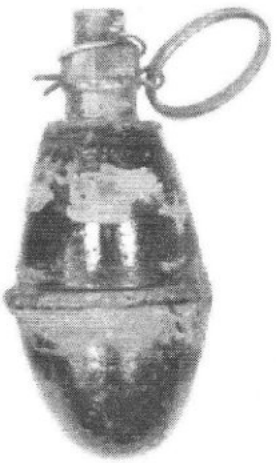
Grenade, Hand, No. 34 Mk. IV [L]

The body of the No. 34 Mk. IV has again been modified; it is slightly smaller than the Mk. III and has a flange around the centre to provide a better gripping surface. The filling plug is centred in the flange and closed by a filling plug.

TYPE- Fragmentation
WEIGHT- 11 oz.
LENGTH- 4.0 in.
DIAMETER- 1.625 in.
IGNITER- Percussion
FUSE DELAY- 5 sec.
FILLING- 1 oz.

The striker mechanism is the same as used on the Mk. II and Mk. III. The detonator assembly is the "Detonator, No. 34 & 34M Grenades, Mk. III.

The body is marked with the designation, manufacturers mark, and date of manufacture. Painted markings include a red filling ring around the top and a pink ring around the centre, just below the flange, denoting a filling of Alumatol or Ammonal.



No. 34 Mk. IV
Photo - Norman Bonney

Grenade, Hand, No. 34M Mk. IV [L]

This is simply a No. 34 Mk. IV with a filling of Trotyl or Baratol 20/80, which are more suitable for use in a tropical climate. With use of the different fillings the painted markings were changed to a ring of red "X's" to denote the suitability for use in tropical climates and a green band denoting the filling of Trotyl or Baratol. The body is still marked with the designation, a manufacturers mark, and date of manufacture. In this case the designation does not include the "M".

Grenade, Hand, No. 34 Instructional

This takes the form of a sectioned grenade used for teaching the mechanism of the grenade.

Grenade, Hand, No. 34 Drill

These grenades may be found in any of the different Marks. They are unfilled grenades used for instruction in the use of the grenade. The grenades are painted white to identify them as drill grenades.

Grenade, .303 inch Rifle, No. 35

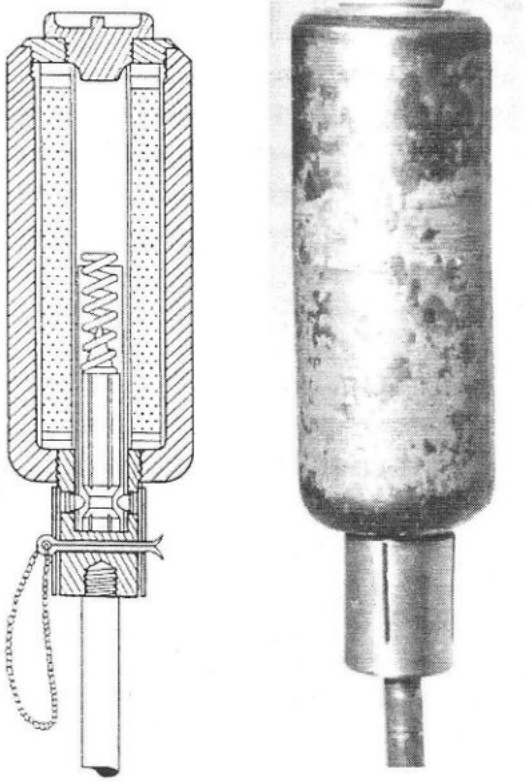
The No. 35 grenade was officially introduced for service in May of 1918.

Grenade, .303 inch Rifle, No. 35 Mk. I [L]

TYPE- Fragmentation
WEIGHT- 1 lb. 7 oz.
LENGTH- 4.75 in. w/o rod
DIAMETER- 1.5 in.
IGNITER- Percussion/Impact
FILLING- 1.5 oz.

This grenade is similar to the No. 24 Mk. II but has some significant changes. The body is plain cast iron without any segmentation. The top end is closed by a brass end cap that screws into the top of the body. A "Detonator, No. 35 Grenade" screws into the end cap. The base piece is considerably shortened and is completely enclosed by the releasing socket. The safety pin passes through both the releasing socket and base piece. The needle pellet is shortened and fitted further into the body. The recess for the retaining bolts is close to the rear end of the pellet. The grenade may be fitted with either an 11-inch or 15 inch launching rod.

The grenade is filled with Ammonal, Alumatol 2, Amatol 83/17, or Cilferite. A red filling ring .25 inch wide is painted around the top. A .5 inch band around the centre of the body denotes the type of filling, a pink band denoting Ammonal, or Alumatol. A



No. 35 Mk. I

green band denotes a filling of Amatol 83/17 and no band denotes a filling of Cilferite. The end cap is marked with the designation, manufacturers mark, and date of manufacture.

There are several detonator assemblies that may be used:

Detonator, No. 35 Grenade, Mk. I - This detonator assembly consists of a shortened .303 inch SA casing with primer, lined with a paper cylinder and enclosing a detonator. The detonator has a pierced base and contains 30.5 grains of a detonating composition (20 parts potassium chlorate, 80 parts fulminate of mercury). Large holes are drilled into the casing opposite the detonator. The rim of the cartridge case is removed and a thin retaining cap retains the primer. The cartridge case is crimped onto the holder which screws into the end cap of the grenade. This detonator is threaded differently than those for other grenades and as such is not interchangeable.

Detonator, No. 35 Grenade, Mk. II - This detonator is constructed in the same manner as the Mk. I, differing only in the dimensions of some parts.

Detonator No. 35 and 35M Grenades, Mk. III - This detonator is again of the same construction but is sealed differently to make it suitable for use in tropical climates.

It should be noted that later issues of the Detonators had the head of the holder painted red to make it easier to determine whether the grenade is fitted with a detonator or the similarly shaped transit plug.

Grenade, .303 inch Rifle, No. 35M Mk. I [L]

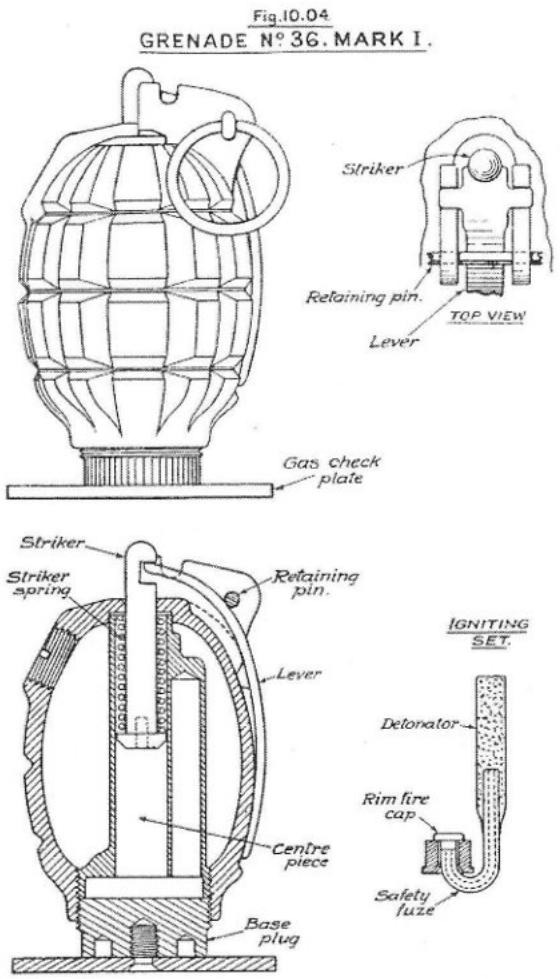


Diagram of the No. 36 Mk. I with Gascheck Mk. I
Taken from the Textbook of Ammunition 1926

This grenade is constructed exactly the same as the No. 35 Mk. I. The only real difference is that the grenade is sealed for use in the tropics and uses only the "Detonator No. 35 and 35M Grenades, Mk. III". This particular grenade may also be known as the "Grenade, .303 inch Rifle, No. 35 Mk. II".

The body is marked on the end cap with the designation, manufacturers mark, and date of manufacture. In addition to the stamped markings the grenade has a ring of red "X, s" around the top indicating its suitability for tropical climates and a coloured band around the centre denoting the type of filling.

Grenade, Hand or Rifle, No. 36

The No. 36 grenade in its various Marks is likely the longest serving grenade in the world, certainly within the British Commonwealth. Its basic design has not changed since 1917 and is still manufactured in Pakistan to the original specifications. In addition to Britain, this grenade was produced in Canada, Australia, South Africa, New Zealand, Pakistan, Indonesia and possibly others. An interesting note for the No. 36M Mk. I is a survey done in April of 1943 of American troops after The Sanananda Battle of the Papuan Campaign. When the troops were surveyed and asked which grenade they preferred, 78.6 % of them stated they preferred Australian Grenades to American grenades (Mk. II).

Grenade, .303 inch Rifle, No. 36 Mk. I [L]

Officially introduced for service in May 1918 and declared obsolete on 5 December 1932. The No. 36 grenade was originally designed as a rifle grenade, later being extended to hand and rifle use. It was for use with a new type discharger cup introduced in 1917. It is very similar to the No. 23 Mk. III.

TYPE- Fragmentation
WEIGHT- 1 lb. 9.25 oz.
LENGTH- 4.0 in.
DIAMETER- 2.4 in.
IGNITER- Time delay
FUSE DELAY- 4 - 7 sec.
FILLING- 2 oz. 2 dr.
2 oz. 13 dr. Amatol

The body is made of cast iron in an oval shape. The outside is grooved in both directions to aid in fragmentation and provide a firm gripping surface. There are two shoulders cast on top that provide pivot points for the safety lever. There is a small hole in top, a filling hole in the upper side, and a large hole formed in the bottom. The bottom hole is threaded to receive a centrepiece and base plug. The side hole is threaded to receive a closing plug. The centrepiece is formed of aluminum, steel, zinc alloy, or tinned brass providing closure to the bottom of the grenade, a central tube, and off to the side a detonator well. The centrepiece screws well up into the body until the top seats in a groove in the top of the grenade aligned with the top hole of the body. The lower end of the threads carries the base plug. A .25 inch closed hole in the centre of the base plug is threaded to accept the "Gascheck, Rifle Grenades, Mk. I [L]". The gascheck consists of a steel disc 2.5 inches diameter. It has a threaded nipple mounted in the centre. The nipple is threaded with Whitworth 1/4" threads to match the hole in the base plug. The baseplate will be marked with the manufacturers mark, date of manufacture, and an "I" for the Mark number.

No. 36 Mk. I fitted with Gascheck Mk. I
Photo - R. Leiendecker

The striker is steel turned down to provide a striking head at the bottom and has a groove cut into the top end to engage the safety lever. A thin groove is cut through the head of the striker to allow the gases formed by the burning fuze to escape. The striker fits into the striker spring, which is then fitted into the central tube. The spring is stopped at the top of the tube and the striker forced up through the top hole to engage the safety lever and compressing the spring. The lever engages in the slot in the top of the striker holding it in the cocked position. A safety pin fits through holes in the shoulders and over the lever holding it down.

The detonator assembly consists of a .22 rimfire cap seated in a cap chamber made of zinc alloy. The cap is attached to one end of the safety fuze with the other end being crimped onto a No. 6 detonator. The fuze is then bent into a "U" shape to fit into the grenade. The fuze initially provided a delay of 7 seconds later being changed to 8.2 seconds plus or minus 1.2 seconds.

The grenade is filled with Ammonal, Alumatol, Amatol 80/20, Cilferite "C", or Amatol 83/17. The body is marked with the manufacturers mark just below the filling hole. The baseplug is marked with the designation, manufacturers mark, and date of manufacture. In addition the safety lever is usually marked with a manufacturers marking. The gascheck will also be marked with a designation (normally "I"), manufacturers mark, and date of manufacture. Painted markings include a red filling ring around the upper portion and a coloured band in the centre denoting the type of filling. A pink band denoting a filling of Ammonal or Alumatol, a green band denoting Amatol.

Before use the grenade must be primed by removing the base plug, inserting a detonator assembly, replacing the base plug and tightening it down with the wrench provided.

No. 36 Mk. I Practice

Grenade, .303 inch Rifle, Practice, No. 36 Mk. I

This grenade is exactly the same as the No. 36 Mk. I grenade in its live version. The grenade body is weighted with sand to give the same weight as a live grenade and not change the characteristics of its flight after firing from the rifle. The grenade came complete with a "Gascheck, Rifle Grenades, Mk. I [L]" and a "Detonator, Practice, No. 36 Grenade, Mk. I". The practice detonator was made to look like a live detonator but contained no explosive content. It is identified by holes in the sides of the detonator.

It is identified by having the body painted white or being electro-zinced. The markings stamped or cast into the grenade are exactly the same as the live version.

Grenade, .303 inch Rifle, Practice, No. 36 Mk. II

This is a minor modification of the Practice Mk. I. The threaded nipple on the gascheck was found to break off with repeated use. A new gascheck using a 3/8" nipple and larger threading solved the problem. The modification was simply a new gascheck and new baseplug to match. It should be noted that the service or live grenade continued to use the smaller threaded nipple on the gascheck. The larger threaded gaschecks were for the practice grenades only. This "Gascheck, Rifle grenades, Mk. II" will be marked with the manufacturers mark, date of manufacture and will have "II" to indicate the mark number.

Grenade, Hand or .303 inch Rifle, No. 36M Mk. I [L]

TYPE- Fragmentation
WEIGHT- 1 lb. 11.25 oz.
LENGTH- 4 in.
DIAMETER- 2.4 in.
IGNITER- Time Delay
FUSE DELAY- 4 - 7 sec.
FILLING- 2 oz. 7 dr.

This grenade is modified from the No. 36 Mk. I. The major changes are different fillings and sealing of the grenade. This grenade is sealed and filled for use in tropical climates. This grenade was introduced officially on 26 March 1918 and may still be found in use today. It has been produced in many of the Commonwealth countries and was still in production in Pakistan as late as 1980.

No. 36M Mk. I

As there are three holes in the body where moisture may enter it was difficult to ensure the grenade was completely watertight. It was necessary to use fillings which are non-hydroscopic and a filling that even if it does get wet, will not attack the metals with which it is contact. In addition there is a waterproofing compound pressed in around the striker where it protrudes from the body. The grenade was filled with Trotyl, Baratol 20/80, or Cilferite. All grenades with a filling of Cilferite were withdrawn from service and destroyed in December 1932. By 1936 Trotyl was declared obsolete for future filling.

The body is marked with a manufacturers mark just below the filling hole. The baseplug is marked with the designation, manufacturers mark, and date of manufacture. In addition the safety lever is usually marked with a manufacturers mark. Painted markings include a ring of red "X's" around the upper portion and a green band around the centre denoting the filling of Baratol or Trotyl. The live versions of the grenade produced in Pakistan are painted black with a red band and have TNT stenciled in yellow below the filling plug.

Grenade, Hand, No. 36M Drill Mk. I

This grenade is constructed exactly the same as the live grenade with the exception that there is no explosive content. It was supplied with a "Detonator, Practice, No. 36 Grenade, Mk. I". The grenade is identified by having five holes drilled in the body, two on each side and one below the filling hole and being painted white. All stamped and cast markings are the same as the live version.

Grenade, Hand, No. 36M Drill Mk. II

This drill grenade was a modification of the Mk. I drill grenade. A wire was fitted through an extra set of holes in the shoulders of the grenade to retain the lever and prevent loss during training. Markings were identical to the Mk. I. Canadian grenades may be found painted dark blue with an orange band and the word "DUMMY" stenciled in white. The orange band was intended to assist the finding of grenades underwater.

Grenade, Hand, Instructional, No. 36M Mk. I

In addition to the grenades listed above, instructional models were produced. Used for instructing the mechanism of the

grenade these took the form of cutaway models. The grenade had 1/4 of the grenade cut out to show the internal workings. The cutout was taken through the side just in front of the shoulders and through the filling plug. The filling is represented by plaster, tinted dark buff. A drill detonator is normally fitted to the grenade. The exterior surface of the grenade is varnished and painted in the same manner as a live grenade.

There are a number of detonator sets that have been used with the No. 36 and 36M grenades. The following list gives the major differences in detonator sets. All the detonator sets consist of a cap chamber made of zinc alloy, a .22 rimfire cap with a hole in the centre to allow gas escape, a length of safety fuze, and a detonator. The hole in the primer is sealed with a varnished paper disc.

Detonator, Grenades No. 36 & 36M, Mk. II - This detonator set has a delay of seven seconds (8.2 seconds + or - 1.2 seconds); it uses No. 16 Safety Fuze coloured yellow and uses a copper No. 6 detonator. In addition, the closed end of the detonator has a convex shape.

Detonator, Grenades No. 36 & 36M, Mk. III This set again has a seven second delay (8.2 seconds + or - 1.2 seconds). It uses No. 16 safety fuze coloured yellow and uses a No. 27 detonator with an aluminum tube with a concave closed end.

Detonator, Grenades No. 36 & 36M, Mk. IV - This detonator set is only for Naval use. It gives a delay of three seconds (4.5 seconds + or - 1.5 sec.). It uses No. 17 safety fuze and Detonator, No. 45 Mk. I.

Detonator, Grenade No. 36M, Mk. V - This detonator set uses No. 17 safety fuze coloured white and has a No. 27 detonator. It provides a four second delay for hand use (4.5 seconds + or - .5 sec.). For night identification it has a paper or rubber band around the safety fuze. Canadian detonators were packed in rectangular tin boxes painted red and had a round, pasted label on top. A yellow "5" is stenciled on the side of the tin.

Detonator, Grenade No. 36M, Mk. VI - This detonator set is similar to the Mk. V but has minor construction differences. Its designation was changed to Mk. VII as a Mk. VI already existed in Indian service.

Detonator, Grenades No. 36M, Mk. VII - This set uses No. 20 safety fuze and a No. 27 type detonator. It is designed to provide a 4 second delay (4.5 seconds + or - .5 seconds). Was originally designated as the Mk. VI. Detonator sets are packed with the grenades in sealed metal tins. Canadian manufactured detonators Mk. VI and Mk. VII were packed in circular tins (Can No. 124) with an opening key similar to that found on tins of luncheon meat. The key is attached to the bottom of the tin. 12 detonator sets are contained in the tin and are covered by a felt disc and a tin spacer marked "Top spacer, discard before replacing lid" The tins are painted red with black markings and a yellow 4 on the side of the tin.

Detonator, No. 36M Grenade, Mk. 8 - This detonator corrected the problems associated with earlier detonator sets. Specifically the non watertight joints between the safety fuze, cap, and detonator as well as the ineffective seal of the hole in the cap. This detonator set gives a delay of 4 seconds. In the Mk. 8 the hole in the rimfire cap is sealed with a layer of varnish, and in place of the tongues that positioned the safety fuze clear of the priming composition a rolled cannelure is provided. The cap is then crimped onto a length of safety fuze 2.125 inches long, the joint being coated before and after assembly with varnish. The safety fuze, No. 20 Mk. 3, is coated with white polythene. The detonator is crimped onto the free end of the safety fuze. It is an aluminum-cased detonator filled with A.S.A. over CE. The joint between fuze and detonator is coated before and after assembly with varnish. Approval for use of this detonator set was withdrawn prior to production stages pending investigations into a more satisfactory safety fuze. It is not presently known if the detonator was ever fully adopted.

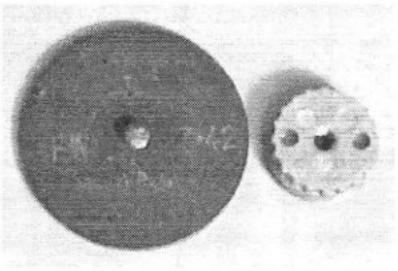
Detonator, Practice, No. 36 Grenade, Mk. I - This practice detonator closely resembles a live detonator but has no explosive fillings. The detonator has two holes drilled in the sides and the entire assembly may be painted a distinguishing colour. Canadian issue are sometimes found painted dark blue.

Accessories for the No. 36 grenade

Gascheck Mk. I - A gascheck is required to fire the No. 36 grenade from the 2.5 inch discharger. The gascheck Mk. I consists of an 2.5 inch iron disc with a 1/4 inch threaded nipple mounted in the centre. This was an issue store used for

both practice and live firing. They are normally issued in boxes "Model No. 529 Mk1" containing both the gaschecks and launching cartridges.

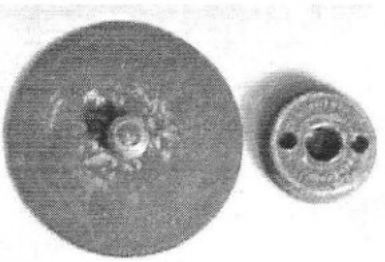
The gascheck is marked with the manufacturers mark, month and year of manufacture, and a roman numeral giving the Mark of the gascheck, in this case "I".



Gascheck Mk. I

Gascheck Mk. II - The "Gascheck Mk. II" was developed to replace the Mk. I for practice use. It was found the 1/4" nipple would break during practice use, not a problem when used for live firing as it is only used once, but in practice use, it will be used many times. To solve the breakage problem, the gascheck was modified to use a 3/8" nipple. In addition the baseplug of the grenade had to be modified to take the larger nipple.

The gascheck is marked with the manufacturers marking, month and year of manufacture, and a roman numeral giving the mark of the gascheck, in this case "II". The baseplug is also marked as a Mk. II, for example "No. 36M Mk. II". A manufacturers mark and the month and year of manufacture will also be found on the baseplug.



Gascheck Mk. II

Gibbons Mechanism - An interesting training accessory for the No. 36 grenade was the "Gibbons Mechanism". It consisted of a spring steel strip fixed by a screw just above the filling hole. The safety lever caught under the spring during "cocking" and the safety pin put in normally. The striker and striker spring were removed when this device was fitted. When the grenade was to be thrown, the thrower performed all the normal drills and threw the grenade, the lever would fly off as normal. This device however allowed for rapid "recocking" of the training grenade.

Clip, Carrier, Grenade, No. 1 Mk. I - Another accessory for the No. 36 grenade was the "Clip, Carrier, Grenade, No. 1 Mk. I". This was an assembly to fit onto the web belt enabling the grenade to be carried safely while attached to the webbing. It consisted of a flat strip of spring steel bent to fit the grenade body. The strip fit between the shoulders of the grenade and has a hole in the top end to fit over the top of the striker. The bottom of the strip has a lug to fit into the central hole of the base plug. The combination of the lug and the hole serve to secure the grenade into the carrier. The grenade clip is riveted to another clip bent to fit the standard web belt. To release the grenade all that was necessary was to lift up on the front of the clip. It is unknown if this was ever actually issued for use.

Grenade, Hand or .303 Rifle, No. 37, Phosphorous, Mk. I

TYPE- Smoke, WP
WEIGHT- 24 oz.
LENGTH- 7.375 in.
DIAMETER- 2.5 in.
IGNITER- Adams mechanism
FUSE DELAY- 6.5 - 7 sec.
FILLING- 12.5 oz.

This grenade was officially introduced for service in September 1917 and declared obsolete on 30 July 1935. It is likely, given the normal practice at the time, that the grenade was actually being used by the troops well in advance of its official introduction date.

The grenade consists of a cylindrical tin plate body with a conically dished head and flat base. The body is made up of three parts; the main cylinder, a base cap, and a top cap all parts being soldered together. A heavy gas check plate is soldered onto the base and a wire steadying ring is also soldered onto the body just below the top cap, both designed for use with the discharger cup. A spigot is soldered onto the top cap, threaded to accept the igniter mechanism. A detonator sleeve is fitted through the spigot and down into the centre of the grenade body. All joints are soldered to give an airtight seal. A striker mechanism screws onto the spigot consisting of a striker holder, striker, shear wire and safety pin. The striker mechanism is protected by a cap that is held in place by the safety pin.

No. 37 Mk. I
Photo - Norman Bonney

The "Burster, No 37 Phosphorous Grenade Mk. II" consists of a .22 rimfire cap, cap

chamber, length of No. 16 fuze and a No. 6 detonator. The cap chamber is made of zinc alloy.

The filling is white phosphorous. The grenade is filled through a filling hole in the side of the top cap that is closed by a soldered disc after filling. The body of the grenade is painted black and has a red filling ring painted around the upper portion of the body to indicate a filled grenade. The designation, a manufacturers mark, and date of manufacture are marked on the bottom of the gas check plate.

The grenade may be used by hand or fired from a 2.5 inch discharger cup. For hand use, the safety pin and cap are removed and the striker hit on a convenient hard object. This breaks the shear wire allowing the striker to hit the percussion cap and initiate the delay train. The grenade is then thrown. When the fuze burns down to the detonator, it explodes, bursting the body and scattering the white phosphorous. The phosphorous ignites upon contact with the air forming an almost immediate smoke screen.

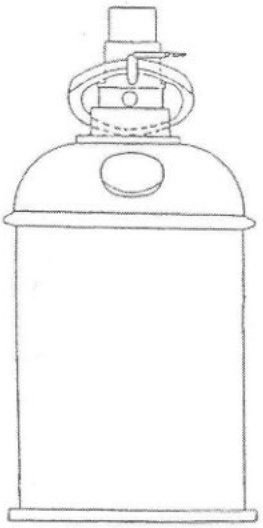
For use with a rifle, the safety pin is removed and the grenade is loaded into the discharger cup. When the rifle is fired, the setback of the striker causes the shear wire to break and allow the striker to hit the percussion cap and start the delay train in the normal manner.

Grenade, Hand or .303 inch Rifle, No. 37, Phosphorous, Mk. II

The Mk. II version of the grenade was officially introduced for service in January 1919.

The body differs from the Mk. I in having a domed top cap and having the tin plate bottom cap omitted. The gas check plate then forms the base of the grenade and is soldered directly to the main body. The steadying ring is formed by the join of the top cap and body that are wrapped and soldered together. The filling hole is located in the side of the domed top and is closed after filling by a soldered metal disc.

The filling is white phosphorous. The body is painted black with a .5 inch red filling ring around the upper half of the body denoting a filled grenade. The designation, a manufacturers mark, and the date of manufacture are stamped into the bottom of the gas check plate. After 1925 the body of the No. 37 was painted green.



No. 37 Mk. II

Grenade, .303 inch Rifle, No. 38 Mk. I, Night Signal

TYPE- Signal, Night
LENGTH- 8 in.
DIAMETER- 2.25 in.
IGNITER- Adams mechanism

This grenade was officially introduced for service in September 1918 and not declared obsolete until 8 August 1956. It is based on the No. 32 Mk II grenade and as such is very similar.

The body is constructed in three pieces, the main body, bottom cap, and top cap. In addition a tin strip is soldered around the body at the point where the dished, base cap ends providing a stronger surface to withstand the shock of firing. A short tube is soldered to the inside of the base cap to wrap the parachute around. The base plate, soldered onto the base cap, has a central threaded hole to accept the 15 inch launching rod. The cap is not soldered on; it is retained in place by its tight fit. A cap that has a threaded spigot soldered on closes the top. The spigot is threaded to match the threading of the striker mechanism that is identical to that used on the No. 27 grenade. It consists of a brass tube with the upper portion reduced in diameter and the bottom threaded to match the threads on the spigot. There are several openings in the tube immediately above the threaded portion to allow gases formed by the burning fuse to escape. A brass striker fits into the reduced section projecting out the top of the tube. It is retained in position by a shear wire that passes through both the striker and tube. The striker mechanism is protected in transit by a tight fitting brass cap that fits over far enough to cover the openings. A safety pin passes through the cap, tube and striker.

The lower portion of the body contains a parachute of Japanese paper folded and packed to ensure it's opening when discharged. The upper portion of the body contains one changing colour star primed by quickmatch and an expelling charge consisting of fine grain gunpowder. The colour-changing star is of two variations, red to green to red, or white to red to white.

The body is painted khaki and has three coloured bands denoting the colour and sequence of the star.

For use, the grenade must first be primed by unscrewing the striker mechanism, inserting an igniter, and replacing the striker mechanism. The grenade is then mounted on the rifle by inserting the launching rod in the barrel of the rifle. The rifle is loaded with a launching cartridge. As the grenade is about to be fired, the safety pin and cap are removed. The rifle is then fired launching the grenade. The setback caused by firing causes the striker to break the shear wire, hit the primer and ignite the safety fuze. The safety fuze burns for three seconds and ignites both the quickmatch and expelling charge. Explosion of the expelling charge blows off the base and pushes the ignited signal star and parachute out of the casing.

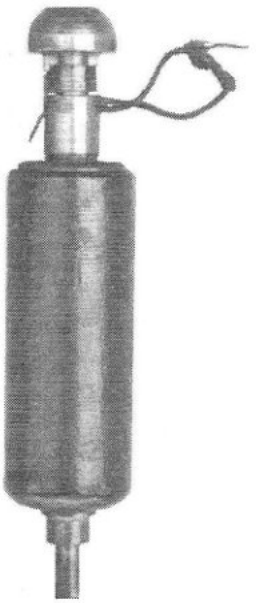
Grenade, Rifle, No. 39 (Stewart)

This grenade was officially introduced for service in June 1919 and declared obsolete in March 1921. Little is really known about the grenade due to its short service period.

Grenade, Rifle, No. 39 Mk. I [L]

TYPE- Fragmentation
WEIGHT- 21 oz.
LENGTH- 4.2 in. body
6 in. overall
DIAMETER- 1.5 in.
IGNITER- Stewart mechanism
FILLING- 1.5 oz.

This grenade is a bit of a departure from previous rodded rifle grenades using a direct action impact igniter. The body is made of cast iron. The bottom of the body has a threaded hole to take a brass base piece. The base piece is nothing more than an adapter to screw the launching rod into. The top of the body is internally threaded to take a brass body plug. A new type igniter mechanism, the "Stewart Attachment", then screws into the body plug. The bottom of the body plug has a platform to support the detonator set.



No. 39 Mk. I

The igniter mechanism (Stewart Attachment) consists of a heavy brass cylinder externally threaded at the bottom end. The upper end is slotted for a passage for the shearing knife. A creep spring is supported inside the cylinder by an internal platform at the bottom end. A guide screw is threaded through the cylinder near the top to engage the striker. The striker is of brass threaded at the top end and slotted to receive the shearing knife. A slot cut into the side of the striker is closed at the bottom end by a small stud. The guide screw engages this slot, preventing the striker from turning and holding it into the mechanism. The bottom end of the striker has the striker point turned onto it. A cast iron head screws onto the threaded portion of the striker. The shearing collar fits around the striker, between the head and main cylinder of the mechanism. The collar is made of brass and slotted to a depth of 7/8 of its total depth. The shearing knife is "T" shaped and fits into the slots cut into the various parts. When fitted it prevents the shearing collar from turning. The safety pin fits through the main cylinder and striker preventing the striker from moving.

The detonator set, "Detonator, No. 39 grenade, Mk. I", consists of a .303 cartridge case before the casing has gone through the process of necking. A percussion cap is fitted in the normal manner. The open end of the casing has a No. 8 Commercial detonator inserted with the open end toward the percussion cap. The detonator is held in place by being paper wrapped and having the end of the cartridge case turned in.

The grenade is marked with a red filling ring around the top of the body and a green or pink band around the centre of the body. The green band denotes a filling of Amatol 83/17, the pink band a filling of Ammonal, military Ammonal, or Alumatol. The designation, manufacturers mark, and date of manufacture are stamped into the top of the body plug.

When the grenade is to be fired, the grenade is loaded onto the rifle and the rifle loaded with a launching cartridge. The safety pin is then removed and the rifle fired. The gases from the launching cartridge push the grenade off the rifle out to a range of up to 350 yards, depending on which rod is used, 11 inch or 15 inch. The shock of firing causes the striker to set back causing the shearing knife to cut through the remaining thin portion of the shearing collar. At this point the two halves are held in position by the head of the striker preventing the striker from hitting the percussion cap. After the

grenade has left the rifle, the spring forces the striker back to its original position releasing the halves of the shearing collar. The striker is then free to move fully within the cylinder. On impact the striker is driven down to hit the percussion cap and fire the detonator exploding the grenade.

Grenade, Rifle, No. 39M Mk. I [L]

This grenade is exactly the same with the exception of the filling and sealing. This version is filled and sealed for use in tropical climates.

Grenade, Hand, No. 40

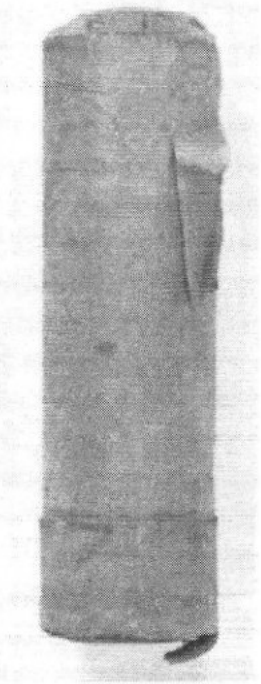
There are few records regarding the No. 40 grenade, however, it was substantially the same as the No. 41. Its dimensions differ with the diameter being about 1 inch. Only small quantities were procured for experimental purposes. It was not adopted as a service store.

Grenade, Hand, No. 41 Mk. I

This grenade was designed for training purposes only. Originally known as "Grenade, Hand, No. 41 Chemical" the word Chemical was dropped from the designation in May 1920. Officially Introduced for service in June 1919 there is no record of when it was declared obsolete.

TYPE- Gas LENGTH- 6 in. DIAMETER- 1.6 in. IGNITER- Matchhead FILLING- 2 oz.

The body is a pasteboard cylinder, 1.6 inches in diameter closed at one end by a wooden plug. A charge of black powder (R.F.G. 2) is contained in a small pasteboard cylinder below the wooden plug. A piece of Bickford fuze protrudes from the cylinder and through the wooden block. The space between the outer cylinder and the inner charge cylinder is filled with fine sawdust. A cap, held on by adhesive tape closes the opposite end of the grenade. Hillite, in liquid form is put into the grenade and absorbed by the sawdust. There is a tear off tape on top of the grenade covering a friction head on the end of the fuze. It was normally ignited using a brassard.



No. 41 Mk. I
Photo - Norman Bonney

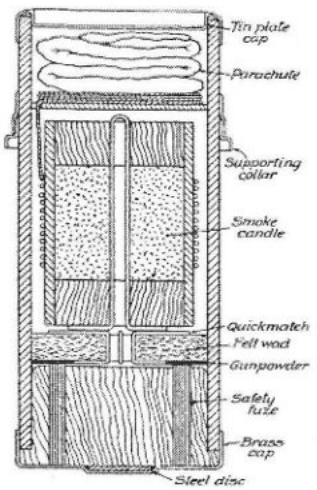
The body is painted drab with markings in black. The grenade is marked on the side with the designation, manufacturers mark, and date of manufacture.

The American CWS (Chemical Warfare Service) tested this grenade in 1918 with an eye to adopting it for service. They tested it with several gases, Phosgene, Diphenylchlorarsine, and Mustard. It was not adopted as the Americans already had other models that would serve the same purpose. The American tests concluded that one grenade exploded in a light wind of 1-2 mph would form a cloud covering a front of 35 feet at 100 feet from the point of burst.

Grenade, Rifle, Day Signal, No. 42 Mk. I [L]

This signal grenade was introduced for service in January of 1919 and was not declared obsolete until 8 August 1956.

The body of the grenade is a rolled paper cylinder that is closed at the bottom by a wooden plug. A brass base cap strengthened in the centre by a steel disc then covers the base. Two holes are bored through the brass cap and wooden plug. The holes are filled with lengths of safety fuze. The top is closed by a tinned plate cap. A supporting collar is fitted to the grenade about 1/3 down from the top. The supporting collar supports the grenade in the discharger cup and closes the cup against rain when the loaded rifle is ready to fire.



No. 42 Mk. I Photo- Norman Bonney

The ends of the safety fuze are exposed so they are ignited by the

firing of the launching cartridge. The fuze burns up to the opening charge. The opening charge consists of 1 dram of F.G. or G.12 powder on top of the wooden plug. A perforated felt wad covers the opening charge. The smoke candle rests on top of the felt wad. A perforated cardboard disc is placed on top of the smoke candle to support the parachute and cord. The parachute is made of japanned paper and fixed to the smoke candle by asbestos cord.

On firing the launching cartridge ignites the safety fuze that burns for about 1/2 second before igniting the opening charge. The opening charge expels the smoke candle and at the same time ignites a quickmatch that protrudes from the candle through the felt wad into the opening charge. The quickmatch then ignites the smoke candle.

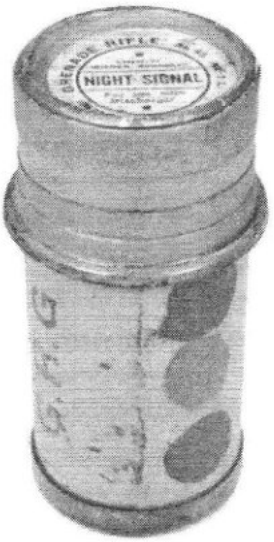
The grenade is painted buff with a coloured serpentine painted on the side in the colour of smoke produced. A pasted paper label on the top cap gives the designation, and manufacturer of the signal. The grenade is produced with either of four colours, red, blue, yellow, or purple. The red smoke candle burns for 20 seconds, all others for 10 seconds.

Grenade, Rifle, Night Signal, No. 43 Mk. I [L]

TYPE- Signal, Night
WEIGHT- 21oz.
LENGTH- 5.5 in.
DIAMETER- 2.5 in.
FILLING- 3 coloured stars

This signal grenade was introduced for service in June of 1919 and was not declared obsolete until 8 August 1956.

The grenade is constructed in the same manner as the No. 42 Mk. I. The body is a rolled paper cylinder closed at the bottom by a wooden plug. A brass base cap strengthened in the centre by a steel disc then covers the base. Two holes are bored through the brass cap and wooden plug and then are filled with lengths of safety fuze. The top is closed by a tinned plate cap. A supporting collar is fitted to the grenade about 1/3 down from the top. The supporting collar supports the grenade in the discharger cup and closes the cup against rain when the loaded rifle is ready to fire.



No. 43 Mk. I
Photo - Norman Bonney

The ends of the safety fuze are exposed so they are ignited by the firing of the launching cartridge. The fuze burns up to the opening charge. The opening charge consists of 1 dram of F.G. or G.12 powder on top of the wooden plug. A perforated felt wad covers the opening charge. The stars rest on top of the felt wad. A perforated cardboard disc is placed on top of the stars to support the parachute and cord. The parachute is made of japanned paper and fixed to the stars by an asbestos cord.

On firing the launching cartridge ignites the safety fuze that burns for about 1/2 second before igniting the opening charge. The opening charge expels the stars and at the same time ignites a quickmatch that protrudes from the stars through the felt wad and into the opening charge. The quickmatch then ignites the stars that burn for 30 seconds each.

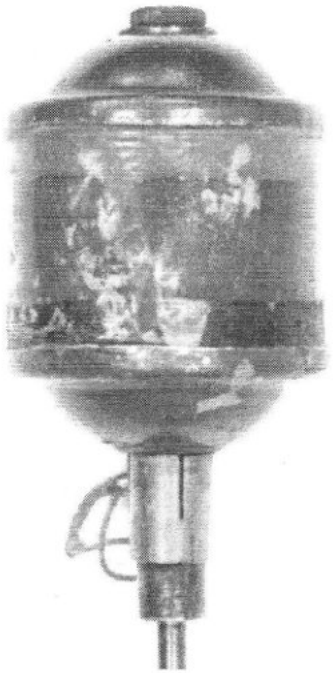
The grenade is painted buff with three coloured discs painted on the side in the colour and sequence of stars. A pasted paper label on the top cap gives the designation, and manufacturer of the signal. The signal is produced with stars of three colours, red, green, and yellow.

Grenade, Rifle, No. 44, A.T. Mk. I[L]

TYPE- Anti-tank
LENGTH- 5.75 in. body
14 in. overall
DIAMETER- 3.0 in.
IGNITER- Percussion/Impact
FILLING- 11.5 oz.

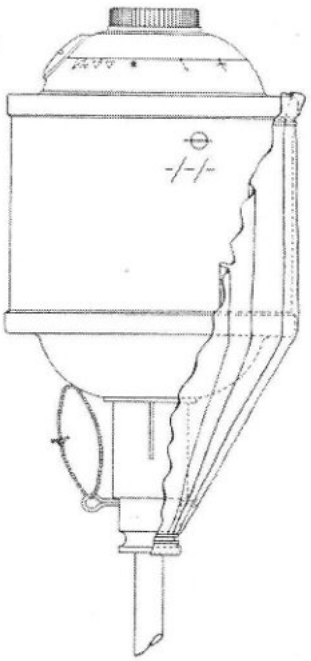
This grenade was developed by the Royal Engineers Experimental Section in France using the No. 24 as a basis for development. Developed in 1917 it was first issued in April of 1918 and by November of 1918 some 9800 grenades had been issued. It was declared obsolete on 21 April 1931 as no stocks remained at that time. It was the first rifle launched antitank grenade designed to give the infantry a weapon with which to destroy tanks. The No. 44 grenade used a large explosive charge in an attempt to defeat armoured vehicles. It was produced before the shaped charge principle was known to defeat armour.

The body is cylindrical in shape with rounded end caps soldered on. A filling plug is located in the top end piece of the grenade. A central sleeve runs through the centre of the body from the base piece to the top of the grenade. A "Detonator,



No. 44 Mk. I
Photo- Norman Bonney

No. 44 AT Rifle Grenade Mk. I" closes the top of the central tube. Contained within the central sleeve is a needle pellet and creep spring. The needle pellet is held in the safe position by two pins, which engage a groove in the needle pellet. A releasing socket holds the retaining pins in place over the base piece. The safety pin fits through the base piece just below the releasing socket preventing the socket from moving until the grenade is fired. An 8 inch launching rod screws into the bottom of the base piece. A canvas vane is attached into a groove at the bottom end of the base piece and in transit or storage is pulled up over the body and retained in place by a wire. The first version of the grenade, possibly manufactured by the Experimental Section, did not have a canvas vane.



The grenade is painted yellow and has a half inch red filling ring around the outside of the top cap. A green band just inside the red filling ring denotes a filling of Amatol 80/20 or Amatol 83/ 17. A manufacturers mark, date of manufacture and the designation are stamped into the top cap. A filling station mark and the date of filling are stenciled on the side of the body.

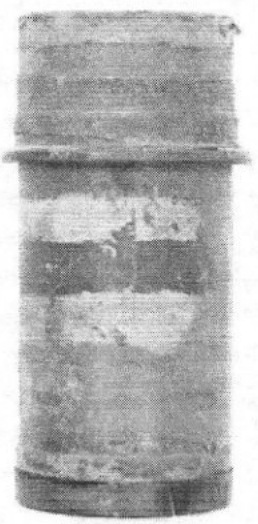
For use, the grenade must first be primed with a detonator by removing the transit plug from the top and inserting the detonator. The grenade can then be loaded onto the rifle in the same manner as other rodded grenades. The canvas vane is then released and pulled back to expose the safety pin. Just before firing the safety pin is removed. When the rifle is fired the inertia from firing causes the releasing socket to pull back exposing the retaining pins. The retaining pins are then free to fall out releasing the needle pellet. The creep spring ensures the needle pellet does not strike the detonator set during flight. When the grenade hits the target the needle pellet overcomes the resistance of the spring and striker the primer in the detonator set causing the grenade to explode.

Grenade, Rifle, Night Signal, No. 45 Mk. I [L]

TYPE- Signal- Night
WEIGHT- 21 oz.
LENGTH- 5.5 in.
DIAMETER- 2.5 in.
FUSE DELAY- .5 sec.
FILLING- colour changing stars

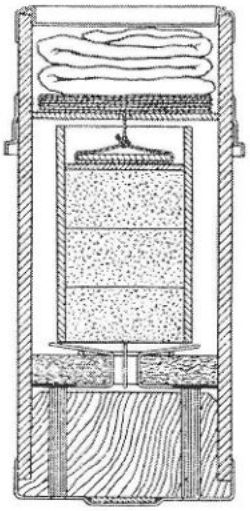
This signal grenade was introduced for service in June of 1918 and was not declared obsolete until 8 August 1956 along with the other signals of this type.

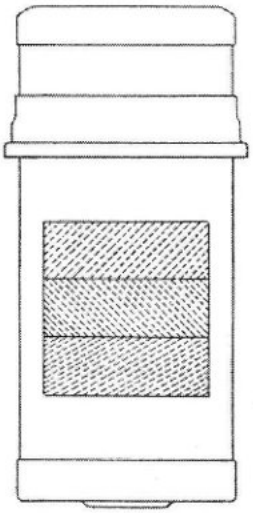
The grenade is constructed in the same manner as the No. 42 Mk. I. The body is a rolled paper cylinder closed at the bottom by a wooden plug. The base is then covered by a brass base cap strengthened in the centre by a steel disc. Two holes are bored through the brass cap and wooden plug and then are filled with lengths of safety fuze. The top is closed by a tinned plate cap. A supporting collar is fitted to the grenade about 1/3 down from the top. The supporting collar supports the grenade in the discharger cup and closes the cup against rain when the loaded rifle is ready to fire.



No. 45 Mk. I
Photo - Norman Bonney

The ends of the safety fuze are exposed so they are ignited by the firing of the launching cartridge. The fuze burns up to the opening charge. The opening charge consists of 1 dram of F.G. or G.12 powder on top of the wooden plug. A perforated felt wad covers the opening charge. The stars rest on top of the felt wad. A perforated cardboard disc is placed on top of the stars to support the parachute and cord. The parachute is made of japanned paper and





fixed to the stars by an asbestos cord.

On firing the launching cartridge ignites the safety fuze that burns for about 1/2 second before igniting the opening charge. The opening charge expels the stars and at the same time ignites a quickmatch that protrudes from the stars through the felt wad and into the opening charge. The stars in the No. 45 are colour-changing stars and may be of two sequences, red-green-red or red-white-red. The stars burn for different durations, the first star burning for 6 seconds, the second for 8-10 seconds, and the last star for 11-13 seconds.

The grenade is painted buff with three bars painted on the side in the colour and sequence of stars. A pasted paper label on the top cap gives the designation, and manufacturer of the signal.

Grenade, Rifle, No. 46 A.T. [L]

Little documentation has come to light regarding this particular grenade. It was a development of the No. 44 grenade. It had a flat base and a filling of poured TNT that was filled from the base. Firing trials using this grenade took place as late as 1922. It was not taken into service.

Grenade, Hand, Incendiary, No. 47 Mk. I [N]

This grenade dates from the 1919-1920 period. It was for Naval service and used for destroying small boats. It was a cardboard-bodied grenade with wooden ends. The igniter set was a "Brock" lighter that would be ignited by a brassard.

Grenade, Rifle, No. 48

The designation for the No. 48 grenade has in actual fact been used twice. It was originally assigned to an RAF "experimental time grenade". Designed by the "Munitions Inventions Department" is was developed along with a projector with the idea that it could be mounted in the back of a Handley Page bomber so that attacking aircraft would get one of the grenades to deal with. The idea fell into disuse and the designation reissued to the signal grenades.

Grenade, Rifle, Day or Night Signal, No. 48 Mk. I [L]

TYPE- Signal- Day or Night
WEIGHT- 21 oz.
LENGTH- 5.5 in.
DIAMETER- 2.5 in.
FUSE DELAY- 0.5 sec.

This signal grenade was introduced for service in September of 1919 and was not declared obsolete until 8 August 1956.

The grenade is again constructed in the same manner as the No. 42 Mk. I. The body is a rolled paper cylinder closed at
the bottom by a wooden plug. The base is then covered by a brass base cap strengthened in the centre by a steel disc. Two holes are bored through the brass cap and wooden plug and then are filled with lengths of safety fuze. The top is closed by a tinned plate cap. A supporting collar is fitted to the grenade about 1/3 down from the top. The supporting collar supports the grenade in the discharger cup and closes the cup against rain when the loaded rifle is ready to fire.

The ends of the safety fuze are exposed so they are ignited by the firing of the launching cartridge. The fuze burns up to the opening charge. The opening charge consists of 1 dram of F.G. or G.12 powder on top of the wooden plug. A perforated felt wad covers the opening charge. The signals rest on top of the felt wad. A perforated cardboard disc is placed on top of the signals to support the parachute and cord. The parachute is made of japanned paper and fixed to the signals by an asbestos cord. The signals consist of four flash signals attached two feet apart on an asbestos string. The signals ignite at 1/2 second intervals.

The grenade is painted buff with no other painted markings. A pasted paper label on the top cap gives the designation, and manufacturer of the signal.

On firing the launching cartridge ignites the safety fuze that burns for about 1/2 second before igniting the opening charge. The opening charge expels the stars and at the same time ignites a quickmatch that protrudes from the stars through the felt wad and into the opening charge. The quickmatch then ignites the signals.

Grenade, Signal, Submerged, No. 49, Day, Mk. I [N]

Reported to be a 2 inch recognition signal to be sent up from submerged submarines. No other information is currently available.

Grenade, Signal, Submerged, No. 50, Night, Mk. I [N]

Reported to be a 2 inch signal, much like the No. 49 Mk. I, used for signaling from submerged submarines. No other information is currently available.

Grenade, Rifle, Day or Night Signal, No. 51

This grenade is similar in construction to the No. 32 Mk. II. It was introduced for service in August of 1919 and declared obsolete on 8 August 1956, the same time as the other signal grenades previously listed. The actual numbers of these grenades produced was very limited.

Grenade, Rifle, Day or Night Signal, No. 51 Mk. I [L]

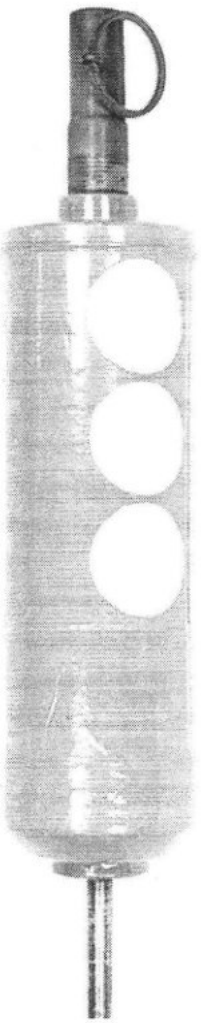
TYPE- Signal
WEIGHT- 2 lb.
LENGTH- 8 in.
DIAMETER- 2.25 in.
IGNITER- Adams mechanism
FUSE DELAY- 3 sec.
FILLING- Illumination stars

The main body is a cylindrical tin case formed in one piece. A tin strip is soldered around the body at the point where the dished, base cap ends providing a strong surface to withstand the shock of firing. A short tube is soldered to the inside of the base cap to wrap the parachute around. The base cap is strengthened by a steel base plate with a central threaded hole to accept the 15-inch launching rod. The cap is not soldered on; it is retained in place by its tight fit. The top is closed by a cap with a threaded spigot soldered on. The spigot is threaded to match the threading of the striker mechanism, which is identical to that used on the No. 27 grenade. It consists of a brass tube with the upper portion reduced in diameter and the bottom threaded to match the threads on the spigot. There are several openings in the tube immediately above the threaded portion to allow gases formed by the burning fuse to escape. A brass striker fits into the reduced section projecting out the top of the tube. It is retained in position by a shear wire that passes through both the striker and tube. The striker mechanism is protected in transit by a tight fitting brass cap that fits over far enough to cover the openings. A safety pin passes through the cap, tube and striker.

The lower portion of the body contains a parachute of Japanese paper folded and packed to ensure it's opening when discharged. The upper portion of the body contains three white illuminating stars primed by quickmatch and an expelling charge consisting of fine grain gunpowder.

For use, the grenade must first be primed by unscrewing the striker mechanism, inserting an igniter, and replacing the striker mechanism. The grenade is then mounted on the rifle by inserting the launching rod in the barrel of the rifle. The rifle is loaded with a launching cartridge. As the grenade is about to be fired, the safety pin and cap are removed. The rifle is then fired launching the grenade. The setback caused by firing causes the striker to break the shear wire, hit the primer and ignite the safety fuze. The safety fuze burns for three seconds and ignites both the quickmatch and expelling charge. Explosion of the expelling charge blows off the base and pushes the ignited signal stars and parachute out of the casing.

The body is painted khaki with three white discs painted on the side. Also painted on the side in black is "DAY OR NIGHT".



No. 51 Mk. II
Photo - Norman Bonney

Grenade, Rifle, Day or Night Signal, No. 51 Mk. II [L]

This version was also officially introduced for service in August of 1919 and declared obsolete at the same time as the Mk. I. The body is constructed for easier manufacture otherwise the grenade is exactly the same as the Mk. I.

Grenade, Rifle, Day or Night Signal, No. 52 Mk. I [L]

TYPE- Illumination
WEIGHT- 21 oz.
LENGTH- 5.5 in.
DIAMETER- 2.5 in.
FILLING- Illuminating stars

This grenade is again constructed in the same manner as the No. 42 Mk. I. The body is a rolled paper cylinder closed at the bottom by a wooden plug. The base is then covered by a brass base cap strengthened in the centre by a steel disc. Two holes are bored through the brass cap and wooden plug and then are filled with lengths of safety fuze. The top is closed by a tinned plate cap. A supporting collar is fitted to the grenade about 1/3 down from the top. The supporting collar supports the grenade in the discharger cup and closes the cup against rain when the loaded rifle is ready to fire.

The ends of the safety fuze are exposed so they are ignited by the firing of the launching cartridge. The fuze burns up to the opening charge. The opening charge consists of 1 dram of F.G. or G.12 powder on top of the wooden plug. A perforated felt wad covers the opening charge. The signals rest on top of the felt wad. A perforated cardboard disc is placed on top of the signals to support the parachute and cord. The parachute is made of japanned paper and fixed to the signals by an asbestos cord. The signals consist of three white illuminating stars.

On firing the launching cartridge ignites the safety fuze that burns for about 1/2 second before igniting the opening charge. The opening charge expels the stars and at the same time ignites a quickmatch that protrudes from the stars through the felt wad and into the opening charge. The quickmatch then ignites the signals.

The grenade is painted buff with three white discs and "Day or Night" painted on the side. A pasted paper label on the top cap gives the designation, and manufacturer of the signal.

Grenade, VML, No. 53 Mk. I [N]

This was a commercial design used for signal purposes. It was to be fired from a type of 2.9 inch mortar. It was not brought into service.

Grenade, Hand or Rifle, No. 54

This grenade was introduced for service in January of 1923. It was designed for use both as a hand grenade and for rifle launching from the new 2 inch discharger cup. It was originally known as the CSOF grenade (Chief Superintendent Ordnance Factories). It was advanced to the Mk. II designation in September 1926. Both marks were declared obsolete in November 1935.

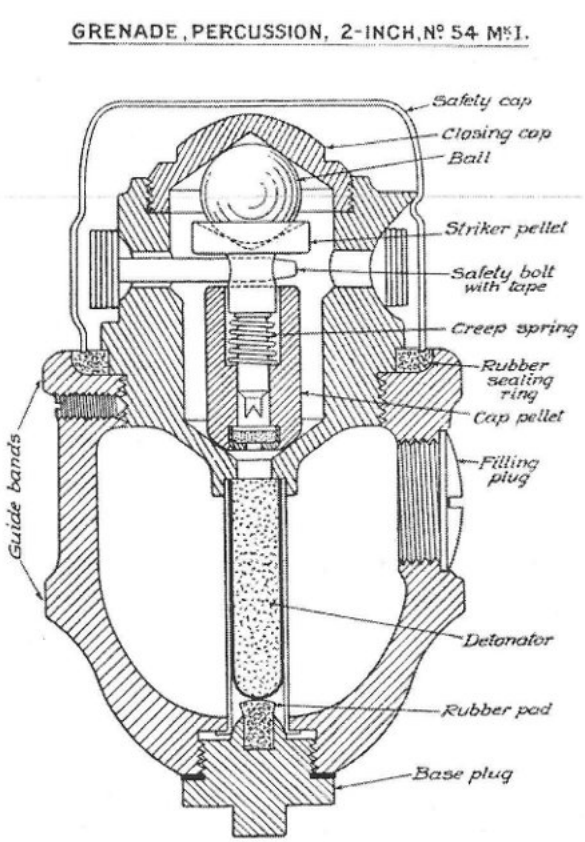
Grenade, Hand or Rifle, No. 54 Mk. I

TYPE- Fragmentation
WEIGHT- 17.5 oz.
LENGTH- 3.5 in.
DIAMETER- 2 in.
IGNITER- Allways

The body is constructed of cast iron with two guide bands machined onto the outer body. The guide bands are a close fit to the discharger cup and increase the accuracy of the grenade when fired. The top is threaded to accept an "Allways" impact igniter mechanism and the bottom threaded to accept a base plug. The filling plug is located in the side of the grenade between the two guide bands.

No. 54 Mk. I
Photo - Norman Bonney

The igniter mechanism is made up of a die cast mechanism chamber which screws into the top of the body with a rubber sealing ring to waterproof the joint. A retaining screw through the body just below the upper guide ring locks the holder in place. A copper tube attached to the bottom of the holder fits through the hole in the bottom of the body and is



then flanged over and sweated to the seat in the baseplug hole. The tube forms the detonator chamber. A hole in the top portion of the holder takes a safety bolt. The mechanism holder is closed at the top by a threaded closing cap with a coned surface on the inside. The firing mechanism consists of a die cast ball resting on the cup shaped head of a tinned steel striking pellet. The striking pellet has a needle stem on the bottom end that ends in a split point. A hole just below the head takes the safety bolt. The striking pellet rides inside a brass cap pellet. The cap pellet is drilled to receive the striking pellet and has at the bottom, a percussion cap mounted in a seat. The percussion cap is filled with 1.2 grains of "Detonating composition A". A creep spring around the striker pellet keeps it away from the percussion cap. The creep spring also serves to keep the ball forced up against the top cap and the cap pellet forced against the coned bottom of the mechanism holder.

The safety bolt is tapered at the end. The opposite end is pivoted to a metal tag with is attached to a cotton webbing tape. The tape is attached a similar tag at the other end and weighted with lead. The safety bolt fits through the hole in the mechanism holder and through the hole in the striker pellet holding it in a safe position. The tape then wraps 2.5 times around the mechanism holder holding the bolt in position.

The safety cap fits over the mechanism holder and locks in position. Indents are punched in the cap which can then only be put over the mechanism holder past the cut outs around the head of the chamber. The mouth of the cap is pressed onto the rubber washer and the cap given a right hand twist of about one tenth of a turn. When the cap is turned, the indents pass under the projecting head of the mechanism holder, locking the cap and sealing the head of the grenade against moisture. When issued the grenade has a piece of tape shellacked across the junction of safety cap and grenade body.

The grenade has a yellow body with a ring of red "X's" around the centre of the body denoting a filling that is suitable for use in tropical climates. A green band near the base denotes a filling of Baratol.

The grenade must be primed prior to use. The base plug is unscrewed and the detonator inserted with the open end up, the base plug is then screwed back on. A small rubber pad on the inside of the base plug provides a point for the detonator to rest on and prevents the detonator from moving within the grenade. The base plug is provided with a tail to aid in its removal.

For hand use, grasp the grenade in the throwing hand. Grip the safety cap with the other hand and turn the grenade, not the cap, in an anti clockwise direction until it can be removed from the cap. The grenade is now ready for throwing. If necessary hold the tape in position with the thumb of the throwing hand. When the grenade is thrown, the natural gyrations of the grenade cause the tape to unwind and allow the safety bolt to fall out or be pulled out by the unwound tape. This frees the firing pellets that are now held apart only by the creep spring. When the grenade lands, the impact causes the striker pellet to hit the primer and fire the grenade. It does not matter how the grenade lands; the mechanism will operate and fire the grenade.

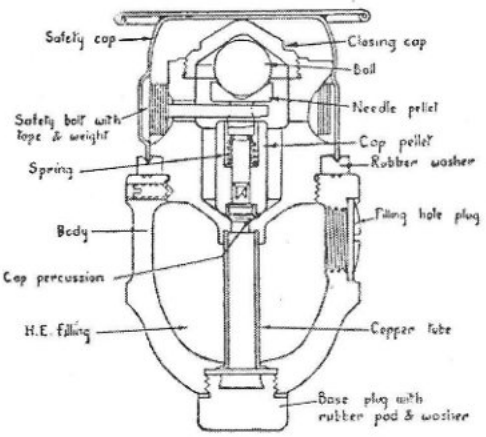
For launching from the rifle, load the rifle with a launching cartridge, prepare the grenade in the same manner as for hand throwing but instead of throwing the grenade, insert it base first into the launcher. The rifle can then be fired and the grenade will operate in the normal manner.

Grenade, Hand or Rifle, No. 54 Mk. II

The No. 54 Mk. II is improved from the Mk. I and was introduced for service in September 1926. The grenade itself is the same as the Mk. I but uses an improved detonator and has a single point striker needle. There is also a disc soldered onto

TYPE- Fragmentation
WEIGHT- 17.5 oz.
LENGTH- 3.5 in.
DIAMETER- 2 in.
IGNITER- Allways

the safety cap to prevent inverting the grenade in the discharger when loading. In addition there is a more efficient seal between the junction of the cap and body. The improved detonator has a rim on the closed end, preventing its insertion with the wrong end up.



No. 54 Mk. II

The body and cap are painted yellow with a ring of red "X's" around the centre. A green band around the bottom of the grenade indicates a filling of Baratol. There are red indexing marks on the cap and body to indicate the cap is in the correct position. The designation "No. 54" is cast into the body between the guide bands.

Grenade, Drill, No. 54

This grenade is made exactly the same as a live version but is identified by having the body galvanized giving it a white appearance. These grenades contain no explosive filler.

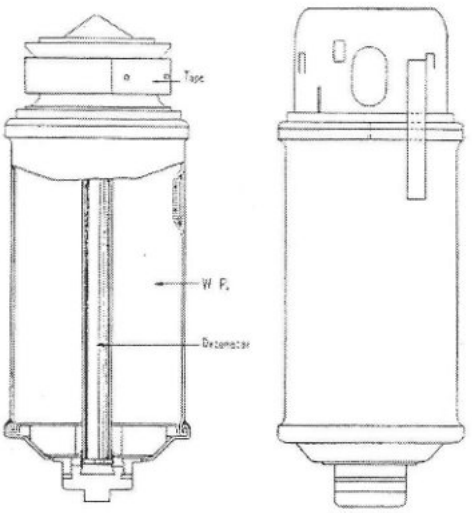
Grenade, Rifle, Smoke, No. 55

This was a smoke grenade designed for use with the 2 inch discharger cup. It was introduced for troop trials in 1925 but did not enter full service. All stocks were withdrawn in 1929 due to leakage during manufacture.

Grenade, Rifle, Smoke, No. 55 Mk. I

TYPE- Smoke, WP
LENGTH- 5.4 in.
DIAMETER- 2 in.
IGNITER- Allways

The grenade was originally designed to overcome the problems with earlier WP grenades where corrosion of the thin bodies and leakage at the joints were the cause of numerous fires. The No. 55 used a more suitable material for the body and all joints were lapped as well as soldered. The detonator sleeve also passed entirely through the grenade from end to end. This allowed inspection of the sleeve for signs of corrosion or leakage. The filling plug is located in the side of the body and is closed by a soldered cap.



No 55 Mk. I
Diagram from "Textbbook of Small Arms 1929"

The firing mechanism, cap, and base plug are all similar to those of the No. 54 grenade. The detonator has the portion containing the fulminate carried on a stem to bring it closer to the primer in the firing mechanism and to place it in a more effective position for bursting the grenade body. The detonator is the sole bursting charge of the grenade. When it fires, it bursts the body of the grenade and scatters the white phosphorous filling. The phosphorous ignites upon contact with the air forming a dense cloud of white smoke. Due to the properties of white phosphorous it has a limited antipersonnel effect and a limited incendiary effect in addition to its smoke producing capabilities.

The grenade must be primed prior to use. The base plug is unscrewed and the detonator inserted with the open end up, the base plug is then screwed back on. A small rubber pad on the inside of the base plug provides a point for the detonator to rest on and prevents the detonator from moving within the grenade. The base plug is provided with a tail to aid in its removal.

Due to its similarity to the No. 54 grenade it is assumed it could also be used for hand throwing. For hand use, grasp the grenade in the throwing hand. Grip the safety cap with the other hand and turn the grenade, not the cap, in an anti

clockwise direction until it can be removed from the cap. The grenade is now ready for throwing. If necessary hold the tape in position with the thumb of the throwing hand. When the grenade is thrown, the natural gyrations of the grenade cause the tape to unwind and allow the safety bolt to fall out or be pulled out by the unwound tape. This frees the firing pellets that are now held apart only by the creep spring. When the grenade lands, the impact causes the striker pellet to hit the primer and fire the grenade. It does not matter how the grenade lands; the mechanism will operate and fire the grenade.

For launching from the rifle, load the rifle with a launching cartridge, prepare the grenade in the same manner as for hand throwing but instead of throwing the grenade, insert it base first into the launcher. The rifle can then be fired and the grenade will operate in the normal manner.

Grenade, Hand or Rifle, No. 56

This grenade was designed in 1929 to replace the No. 55. After finishing troop trials in 1930, 2000 grenades were ordered. The design was abandoned in 1933 when the 2 inch discharger was dropped in favor of the 2.5 inch discharger cup.

Grenade, Hand or Rifle, Smoke, No. 56 Mk. I

TYPE- Smoke, Screening LENGTH- 4.0 in. DIAMETER- 2 in. FILLING- SR269

This grenade has a thin drawn steel body formed into a cylinder and closed at one end. The body is filled with a smoke mixture (Hexachlorethane/zinc) pressed in under pressure. The filling is covered with a priming composition then by a millboard disc and several millboard washers. A gunpowder initiator attached to 18 inches of quickmatch is inserted into the cavity left and the grenade then closed by turning over the end of the body onto a perforated steel disc. The steel disc has two perforations covered by tinfoil discs soldered on. A press fit tin cap that has a ring attached to the top to assist in its removal then protects the base.

The body of the grenade is painted green with a red filling ring. The designation, date of manufacture and manufacturer will also be marked on the body.

For use, the rifle is loaded with a launching cartridge. The tin cap must be removed and the grenade loaded into the launched base first. When the rifle is fired the flash from the launching cartridge penetrates the tinfoil discs and ignites the quickmatch. The quickmatch ignites the initiator, then the priming composition and finally the smoke composition. The smoke composition is actually ignited during the flight of the grenade but will continue to burn and produce smoke after landing. This grenade produces smoke for approximately one minute.

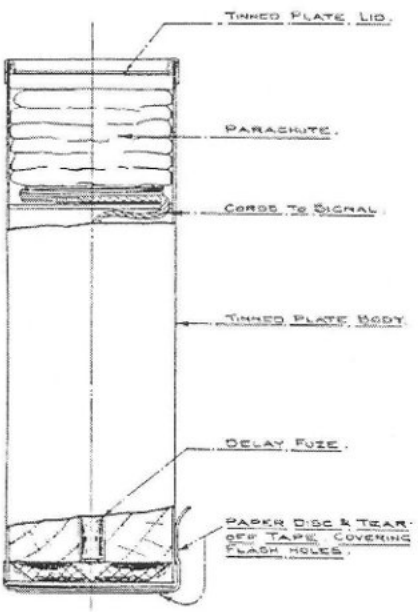
Signal, 2 inch (Never Designated)

When the 2 inch discharger was brought into service there became a requirement for signal grenades to fit the discharger. Initial work began in 1921 and concentrated on employing the pyrotechnic signals from the cardboard 2.5 inch series in a thin tinplate cylinder. The signals were for "intercommunication between troops" and included both daylight and night requirements. The requirements were: 1- SOS, warning to Artillery, 2- Illuminating, 3- Gas, warning of a gas cloud, and 4- Lengthen range, Infantry to Artillery. Over the next few years there were considerable departmental investigations but troop trials did not take place until 1929. In 1932 it was decided that the following signals were required.

1- a three star signal, Red, Red, Red and Red, Green, Red, in both night and day configurations.

2- multi stars in Red, or Green, or Red and Green, again in both night and day configurations

3- illumination, both with and without parachute.



2 inch Signal
Diagram from "Textbook of Small Arms 1929"

The two-inch signals consist of a thin tinplate cylinder closed by a tin cap with two flash holes through it. Slightly above the cap is a wooden block. This block is held in position by four tacks through the side of the cylinder into the block. The block is perforated by a single hole filled with safety fuze to provide a delay. Between the cap and wooden block are pieces of quickmatch leading to the safety fuze. The bottom is then cover by a paper disc and piece of tear off tape covering the flash holes. Above the wooden block is the expelling charge and above that the signal itself. A cord is attached from the signal to the parachute through a cardboard separator. The top of the grenade is then closed by another tin cap.

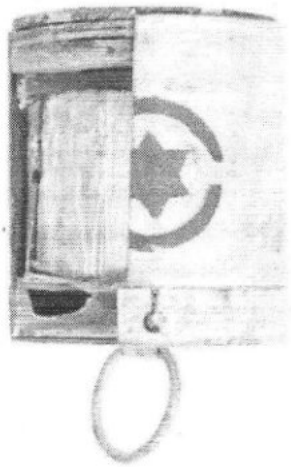
For use, the tear off tape is pulled off exposing the flash holes. The grenade is loaded into the discharger with the flash holes toward the bottom. When the rifle is fired, the flash from the cartridge passes through the flash holes igniting the quickmatch that then ignites the safety fuze. At the same time the launching cartridge has forced the signal out of the launcher and sent it up into the air. When the safety fuze burns up to the expelling charge it ignites sending the signal and parachute out of the cylinder, igniting the signal at the same time.

The design of the signals was approved in October 1932. In May of 1933 it was decided to revert back to the 2.5 inch discharger cup and a new series of signals were prepared based on the 2 inch signals but scaled up for the 2.5 inch discharger.

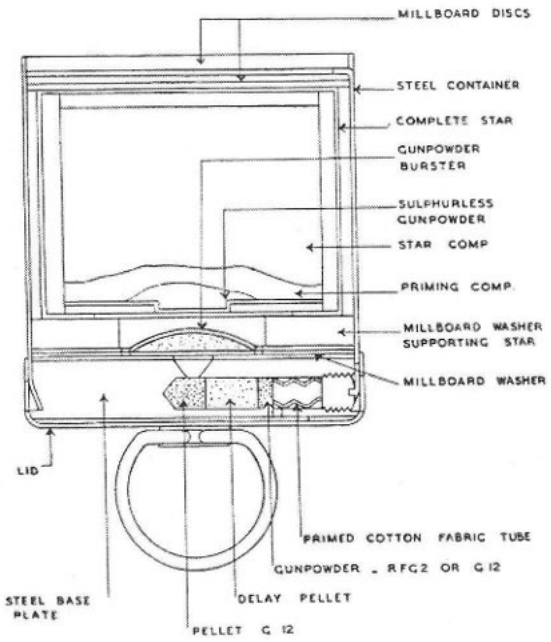
Grenade, Rifle, Illumination, No. 57 Mk. I

TYPE- Illumination
WEIGHT- 16.5 oz.
LENGTH- 3 in.
DIAMETER- 2.5 in.
FILLING- 4.4 oz.

This was the first of the various signal grenades designed for use with the 2.5 inch discharger cup after the 2 inch discharger was dropped. Introduced officially in September of 1937 it was not declared obsolete until August 1956. Ordnance Board Proceeding 1194, dated 25 April 1939 states that "no more will be made due to vagaries in functioning, and its function will be taken over by the illumination bomb for the two inch mortar".



No. 57 Mk. I Sectioned
Photo - Norman Bonney



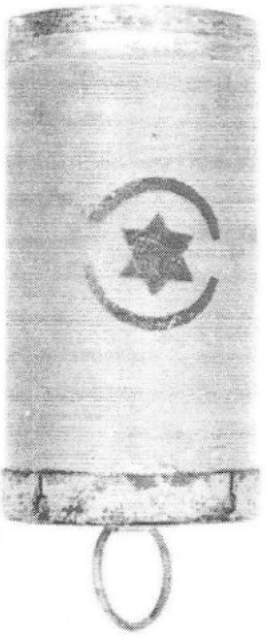
The body consists of a steel cylinder closed at the top end by a millboard disc and at the bottom by a thick steel base plate. The casing is 2.75 inches long. The base plate has a radial hole drilled in it with a small hole through the bottom at the outer edge connecting with the radial hole. At the inner end of the radial hole a coned hole connects with the interior of the grenade. The radial hole is closed by a screwed plug and contains a tube with a layer of primed cotton fabric, layer of gunpowder, delay element, and finally another layer of gunpowder. The illumination star rests on a number of millboard washers that provide a space in the centre for the burster. The star consists of a cylindrical rocket paper case with a wrapping of white paper. It is closed at the top by a millboard disc and at the bottom by a millboard washer and muslin disc. The filling is 1930 grains of illuminating composition SR577 that has a layer of priming composition and a layer of sulphurless gunpowder on the base. The bottom end of the grenade is closed by a steel lid with pull ring attached.

The body is painted in a stone colour and has a red star within a broken red circle.

The grenade is loaded into the discharger base first, after removing the steel cap. When the rifle is fired, the grenade is projected into the air and at the same time the flash from the launching cartridge enters the small hole and ignites the ignition system. The delay is sufficient to allow the grenade to reach a height of 250 feet before the burster ignites. The

burster pushes the star case out of the casing and ignites it. The star burns producing 500000 cp of brilliant white light for approximately 5.5 seconds.

Grenade, Rifle, Illumination, No. 58 Mk. I



No. 58 Mk. I
Photo - Norman Bonney

TYPE- Illumination
WEIGHT- 1 lb. 7 oz.
LENGTH- 5 in.
DIAMETER- 2.5 in.
FILLING- 6.75 oz.

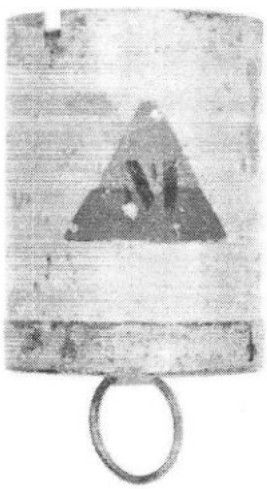
This grenade is manufactured in the same manner as the No. 57, differing only in size and type of star. This grenade was introduced for service in September 1937 and declared obsolete in August 1956. The functioning of this series of grenade was not reliable and they were replaced by equivalent shells for the 2 inch mortar.

The body consists of a steel cylinder 5 inches long, closed at the top end by a millboard disc and at the bottom by a thick steel base plate. A tinplate band is soldered around the body near the top end. The base plate has a radial hole drilled in it with a small hole through the bottom at the outer edge connecting with the radial hole. At the inner end of the radial hole a coned hole connects with the interior of the grenade. The radial hole is closed by a screwed plug and contains a tube with a layer of primed cotton fabric, layer of gunpowder, delay element, and finally another layer of gunpowder. The illumination star rests on a number of millboard washers that provide a space in the centre for the burster. A 30-inch parachute attached to the star rests on top of the illumination star. The bottom end of the grenade is closed by a steel lid with pull ring attached.

The star consists of 6.75 oz. of SR565 illuminating compound. The body is painted in a stone colour and has a red star within a broken red circle. The designation is stenciled on the side of the grenade.

The grenade is loaded into the discharger, after removing the steel cap, with the base first. When the rifle is fired, the grenade is projected into the air and at the same time the flash from the launching cartridge enters the small hole and ignites the ignition system. The delay is sufficient to allow the grenade to reach a height of 250 feet before the burster ignites. The burster pushes the star case out of the casing and ignites it. The star burns with a brilliant white light for approximately 28 seconds as it drifts down held up by its parachute.

Grenade, Rifle, Day Signal, No. 59 Mk. I



No. 59 Mk. I
Photo - Norman Bonney

TYPE- Signal- Day
WEIGHT- 1 lb. 8.5 oz.
LENGTH- 3.5 in.
DIAMETER- 2.5 in.
FILLING- 3.75 oz.

This grenade was introduced along with the rest of the series in September 1937 and declared obsolete in August of 1957. The functioning of this series of grenade was not reliable and they were replaced by equivalent shells for the 2 inch mortar.

The body consists of a steel cylinder 3.5 inches long, closed at the top end by a millboard disc and at the bottom by a thick steel base plate. The base plate has a radial hole drilled in it with a small hole through the bottom at the outer edge connecting with the radial hole. At the inner end of the radial hole a coned hole connects with the interior of the grenade. The radial hole is closed by a screwed plug and contains a tube with a layer of primed cotton fabric, layer of gunpowder, delay element, and finally another layer of gunpowder. The signal stars rest on a number of millboard washers that provide a space in the centre for the burster. . The bottom of the grenade is closed by a steel lid with pull ring attached.

The body is painted in a stone colour and has a coloured triangle in the colour of stars and an "M" stenciled on the triangle. If a combination of stars is contained the triangle is subdivided by colours. The designation is stenciled on the side of the grenade.

The grenade is loaded into the discharger, after removing the steel cap, with the base first. When the rifle is fired, the grenade is projected into the air and at the same time the flash from the launching cartridge enters the small hole and

ignites the ignition system. The delay is sufficient to allow the grenade to reach a height of 250 feet before the burster ignites. The burster pushes the stars out of the casing and ignites them. The grenade contains 12 stars in either of three combinations, all red, all green, or a combination of red and green stars. The green stars are composed of 138 grams of SR 477 and the red stars of 138 grams of SR232. The stars will burn for approximately 7 seconds.

Grenade, Rifle, Night Signal, No. 60 Mk. I

TYPE- Signal- Night
WEIGHT- 1 lb. 8.5 oz.
LENGTH- 3.6 in.
DIAMETER- 2.5 in.
FILLING- 4 oz.

This grenade was introduced along with the rest of the series in September 1937 and declared obsolete in August of 1957. The functioning of this series of grenade was not reliable and they were replaced by equivalent shells for the 2 inch mortar.

No. 60 Mk. I
Photo - Norman Bonney

The body consists of a steel cylinder closed at the top end by a millboard disc and at the bottom by a thick steel base plate. The casing is 3.5 inches long. The base plate has a radial hole drilled in it with a small hole through the bottom at the outer edge connecting with the radial hole. At the inner end of the radial hole a coned hole connects with the interior of the grenade. The radial hole is closed by a screwed plug and contains a tube with a layer of primed cotton fabric, layer of gunpowder, delay element, and finally another layer of gunpowder. The signal stars rest on a number of millboard washers that provide a space in the centre for the burster. The bottom end of the grenade is closed by a steel lid with pull ring attached.

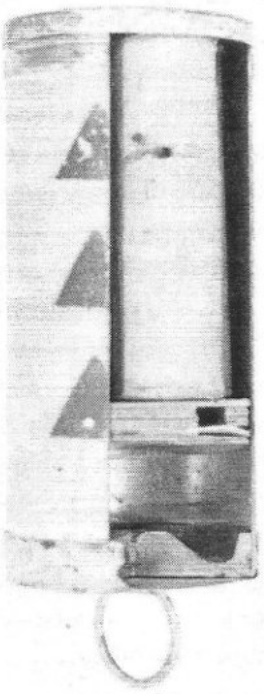
The signal stars consist of 128 gr. of SR 287 for red or SR475 for green. The body is painted in a stone colour and has a coloured disc in the colour of stars and an "M" stenciled on the disc. If the signal contains a mixture of stars the disc will be subdivided by colours. The designation is stenciled on the side of the grenade.

The grenade is loaded into the discharger, after removing the steel cap, with the base first. When the rifle is fired, the grenade is projected into the air and at the same time the flash from the launching cartridge enters the small hole and ignites the ignition system. The delay is sufficient to allow the grenade to reach a height of 250 feet before the burster ignites. The burster pushes the stars out of the casing and ignites them. The grenade contains either of three combinations of 12 stars, all red, all green, or a combination of red and green. The stars burn for approximately 11.5 seconds for red and 8 seconds for green.

Grenade, Rifle, Day Signal, No. 61 Mk. I

TYPE- Signal- Day
WEIGHT- 1 lb. 4.5 oz.
LENGTH- 5.75 in.
DIAMETER- 2.5 in.
FILLING- Coloured stars

This grenade was introduced along with the rest of the series in September 1937 and declared obsolete in August of 1957. The functioning of this series of grenade was not particularly reliable and they were replaced by equivalent shells for the 2 inch mortar.



No. 61 Mk. I
Sectioned
Photo - Norman Bonney

The body consists of a steel cylinder closed at the top end by a millboard disc and at the bottom by a thick steel base plate. The length of the casing is 5.5 inches. The base plate has a radial hole drilled in it with a small hole through the bottom at the outer edge connecting with the radial hole. At the inner end of the radial hole a coned hole connects with the interior of the grenade. The radial hole is closed by a screwed plug and contains a tube with a layer of primed cotton fabric, layer of gunpowder, delay element, and finally another layer of gunpowder. The signal stars rest on a number of millboard washers that provide a space in the centre for the burster. A 30-inch silk parachute, attached to the stars by twin asbestos cords and copper wire, rests on top of the stars. The bottom end of the grenade is closed by a steel lid with pull ring attached.

The body is painted in a stone colour and has 3 coloured triangles in the colour and sequence of stars. The designation is stenciled on the side of the grenade.

The grenade is loaded into the discharger, after removing the steel cap, with the base first. When the rifle is fired, the grenade is projected into the air and at the same time the flash from the launching cartridge enters the small hole and ignites the ignition system. The delay is sufficient to allow the grenade to reach a height of 250 feet before the burster ignites. The burster pushes the stars and parachute out of the casing and ignites them. The grenade contains either of three combinations of 3 stars, all red, all green, or a combination of red and green. The stars are composed of SR232 for red and SR 477 for green. The stars burn for approximately 25 seconds for red and 20 seconds for green.

Grenade, Rifle, Night Signal, No. 62 Mk. I

TYPE- Signal- Night
WEIGHT- 1 lb. 4.5 oz.
LENGTH- 5.75 in.
DIAMETER- 2.5 in.
FILLING- Coloured stars

This grenade was introduced along with the rest of the series in September 1937 and declared obsolete in August of 1957. The functioning of this series of grenade was not reliable and they were replaced by equivalent shells for the 2 inch mortar.

The body consists of a steel cylinder 5.5 inches long, closed at the top end by a millboard disc and at the bottom by a thick steel base plate. The base plate has a radial hole drilled in it with a small hole through the bottom at the outer edge connecting with the radial hole. At the inner end of the radial hole a coned hole connects with the interior of the grenade. The radial hole is closed by a screwed plug and contains a tube with a layer of primed cotton fabric, layer of gunpowder, delay element, and finally another layer of gunpowder. The signal stars rest on a number of millboard washers that provide a space in the centre for the burster. A 30-inch silk parachute, attached to the stars by twin asbestos cords and copper wire, rests on top of the stars. The bottom end of the grenade is closed by a steel lid with pull ring attached.

The body is painted in a stone colour and has 3 coloured discs in the colour and sequence of stars. The designation is stenciled on the side of the grenade.

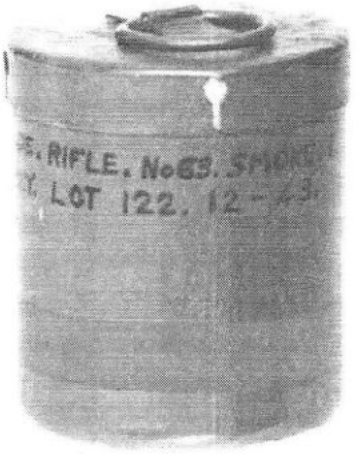
The grenade is loaded into the discharger, after removing the steel cap, with the base first. When the rifle is fired, the grenade is projected into the air and at the same time the flash from the launching cartridge enters the small hole and ignites the ignition system. The delay is sufficient to allow the grenade to reach a height of 250 feet before the burster ignites. The burster pushes the stars and parachute out of the casing and ignites them. The grenade contains either of four combinations of 3 stars, red-red-red, green-green-green, red-green-red, or green-red-green. The red stars, composed of SR287, burn for approximately 12 seconds. The green stars, composed of SR 475, burn for about 19 seconds.

Grenade, Rifle, Smoke, No. 63 Mk. I

TYPE- Smoke, Screening
WEIGHT- 1 lb. 3 oz.
LENGTH- 3.0 in.
DIAMETER- 2.5 in.
FUSE DELAY- 5 sec.

This grenade was introduced for service in March 1935 and declared obsolete in December 1945.

The body is a thin, drawn steel cylinder closed at one end. The closed end is marked "TOP" and has a circular corrugation centred on the end. The body is filled with a smoke composition with a depression in the centre. A tinplate disc covers the smoke composition and a flanged tinplate cup is inserted through the disc into the depression. Millboard discs with holes in the centre then covers the tin plate cover. The delay pellet in a fibre tube fits through the central hole in the millboard discs and down into the cup. The remainder of the cup is filled with priming compound. On top of the millboard disc are several millboard washers to fill the remainder of the steel body. The cavity formed by the washers is filled with quickmatch. The entire body is closed by a tinplate disc that has two holes opposite each other. Tin plate discs are soldered over the holes to seal them. The end is covered by a protective cap with a ring attached to the centre.



No. 63 Mk. I
Photo - Peter Ritchey & Robert Morgan

The grenade is painted Brunswick green with a red filling ring around the lower half of the body. The designation and lot number are stenciled in black around the upper half of the body.

For use, the protective cap is removed and the grenade loaded into the launching cup bottom first. When the grenade is

fired, the flash from the launching cartridge penetrates the thin closing discs and ignite the quickmatch. The quickmatch in turn ignite the delay pellet that gives a delay of about 5 seconds before igniting the priming composition. The delay allows for flight time of the grenade before the smoke is emitted. The priming composition then ignites the main smoke charge. White smoke was emitted for about one minute.

Grenade, Rifle, Smoke, No. 63 Mk. IZ

This version differs only in being filled with a different smoke composition.

Grenade, Rifle, Daylight Signal, No. 64 Mk. I

TYPE- Signal- Day
WEIGHT- 1 lb. 5 oz.
LENGTH- 2.5 in.
DIAMETER- 2.5 in.
FILLING- Two white stars

This signal grenade was introduced for Naval Service only. Officially introduced for service in 1936 it was still classed as a current grenade in 1967. Little information is currently available to me but the grenade was similar to the No. 65 in construction consisting of a cylindrical tinplate body containing a two star signal. The grenade is painted in a stone colour and is marked with a red star in a broken circle.

Grenade, Rifle, Daylight Signal, No. 64 Mk. II

This grenade is the same as the Mk. I but has modified powder priming. It was introduced for service on March 1941 and has remained in service past 1967.

Grenade, Signal, No. 65

This signal grenade is specially designed to be fired from a special 2.5 inch discharger cup mounted on the 1.5 inch signal pistol or from a submarine apparatus known as a "Float Submerged Signal". It was introduced in September 1940 for Naval Service only. It has remained in service at least until 1967 and probably past. It was advanced through a number of "Types" and "Marks" as shown below. The "Type" is effectively the colour of the signal. They provided larger and brighter flares than could be achieved with normal 1.5 inch "Very" flares.

Grenade, Signal, No. 65 Type 1 Mk. I

Introduced for service in September 1940. The body is tinplate closed at the bottom by three perforated millboard discs and a paper disc. The perforations are filled with gunpowder as a primer. The body is paper lined and filled with a flare composition. The flare can be projected 150 feet from a surface vessel or from a submerged submarine using a float signal.

The body is buff with a red filling ring around the top. It has the designation, lot number, manufacturers mark, and date of filling stenciled on the body. An embossed ring on the top aids identification at night. The top of the signal is stenciled with "LOAD INTO DISCHARGER THIS WAY UP".

Grenade, Signal, No. 65 Type 1 Mk. II

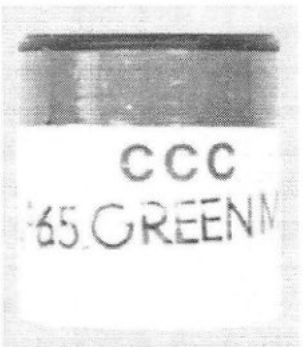
Introduced for service in February 1944. As for the Mk. I but with a modified filling.

Grenade, Signal, No. 65 Type 2 Mk. I

Introduced for service in August 1940.

Grenade, Signal, No. 65 Type 2 Mk. II

Introduced for service in February 1944. As for the Mk. I but with a modified filling.



No. 65
Photo - Norman Bonney

Grenade, Signal, No. 65 Type 3 Mk. I

Introduced for service in August 1940

Grenade, Signal, No. 65 Type 3 Mk. II

Introduced for service in February 1944. As for the Mk. I but with a modified filling.

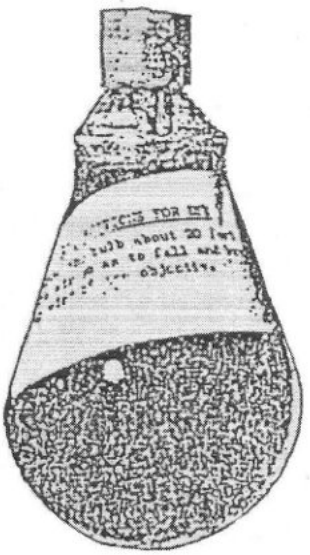
Grenade, Signal, No. 66

This was a signal grenade developed for Naval service only. It was designed for firing special Naval discharger mounted on the 1.5 inch Signal pistol. Similar to the No. 65, little documentation has come to light regarding this grenade.

Grenade, Hand, Lachrymatory, No. 67 [L]

TYPE- Gas
LENGTH- 4.375 in.
DIAMETER- 2.5 in.
FILLING- 250cc

This was designed in early World War II as one of the "Fear of Invasion" emergency pattern stores. The grenade was never formally introduced for service but was produced. It is unlikely this grenade was actually used due to its extreme fragility.



No 67 Mk. I

This grenade is nothing more than the bulb portion of a 100-watt light bulb filled with a lachrymatory liquid and sealed with plaster of paris. The filling is 250 cc of SK or MSK. SK is a mixture of 75% Ethyl Iodoacetate and 25% Alcohol whereas KSK is 100% Ethyl Iodoacetate.

A paper label attached to the grenade is marked "INSTRUCTIONS FOR USE: THROW BULB ABOUT 20 FEET IN THE AIR SO AS TO FALL AND BREAK UPWIND OF THE OBJECTIVE".

Upon exposure to the air the liquid would vaporize creating a localized gas cloud. SK an MSK are intensely irritating to the eyes and respiratory tract, causing involuntary tearing and violent coughing.

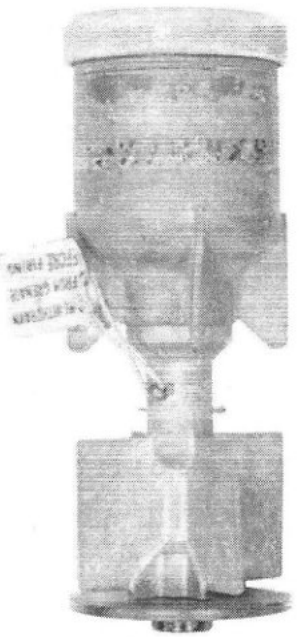
Grenade, Rifle No. 68 AT

This grenade has the distinction of being the first grenade to use the hollow charge principle to defeat armour. The Research Department of Woolwich Arsenal undertook the development of this grenade prior to the war in 1939 and had it in production by May 1940. It was sent to the British Expeditionary Force in France in 1940 and likely saw some action there. It was also fielded in the Western desert and issued in large numbers to the Home Guard. The grenade was normally launched from the 2.5 inch discharger cup but was also fired from the Northover Projector by the Home Guard. Due to advances in tank design and better anti tank weapons coming on line, production of the No. 68 grenade was virtually finished by January 1943.

Grenade, Rifle, No. 68 AT Mk. I

TYPE- Anti-Tank
WEIGHT- 1 lb. 15.5 oz.
LENGTH- 6.5 in.
DIAMETER- 2.5 in.
IGNITER- Impact

The Mk. I version was officially introduced for service in November 1940 but had been in use since May of that year. It was not declared obsolete until May of 1945 along with all other Marks of the grenade.



No. 68 Mk. I
Photo - Norman Bonney

The body consists of a bell shaped warhead with four small vanes cast on to the bottom portion. The head is closed by a steel screw collar and closing disc. The closing disc may be either brass, tin plate, or steel. The bottom is threaded to accept the fin assembly. The explosive charge is contained within the head and shaped against a hemispherical brass charge liner. The fin assembly is cast with four vanes onto a cylindrical centre portion. The igniter mechanism is contained within the centre section and consists of a striker, creep spring and brass detonator holder containing a percussion cap, 5-grain lead azide detonator,

and CE pellet. The CE pellet is held onto the detonator holder by a threaded cap completely covering the pellet. The striker and creep spring are contained in the centre section of the fin assembly and held in position by a safety pin and copper shear wire. The striker may be made of rustproofed steel or a steel needle set in a Mazak holder. The detonator holder screws into the top of the centre section with the CE pellet extending above the top and the percussion cap facing the striker. The entire fin assembly then screws into the bottom of the warhead with the CE pellet inside the head. A steel gas check is mounted at the bottom of the fins, originally held in place by a bakelite screw, which would break on launch and allow the gas check to fall off. Later issues were held in place by a steel screw and did not allow the gas check to fall off. It was found that it made no appreciable difference in range or accuracy if the gas check remained in place.

The body is unpainted with a red filling ring and Green ring with an overprint in black with the explosive letters if filled with RDX/BWX 91/9 or PE.

For use, the grenade is loaded in the launcher far enough to pull out the safety pin, and then pushed fully home in the launcher. The rifle is fired using a launching cartridge that pushes the grenade out of the launcher. At the same time, the setback caused by firing breaks the shear wire fully arming the grenade. The striker is held off the percussion cap in flight by the creep spring. When the grenade strikes the target, the weight of the striker overcomes the resistance of the creep spring and hits the percussion cap. The firing of the percussion cap ignites the detonator that in turn ignites the CE pellet. The explosion of the CE pellet sets off the main charge.

Grenade, Rifle, No. 68 AT Mk. II

TYPE- Anti-Tank
WEIGHT- 1 lb. 15.5 oz.
LENGTH- 6.5 in.
DIAMETER- 2.5 in.
IGNITER- Impact

This version of the No. 68 was officially introduced for service in November of 1940, at the same time as the Mk. I. This is the official introduction date, not the date it was actually fielded. It was declared obsolete in May 1945.

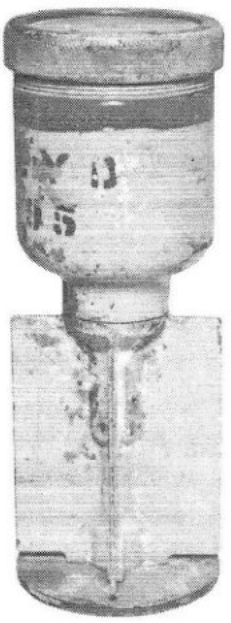
The Mk. II shows a marked difference in body style. The small vanes have been eliminated from the body and the tail fins extended. This was modified due to the unsatisfactory performance of the interrupted vanes. The gas check is held on with a brass screw or may be riveted on. In other respects the grenade is as for the Mk. I.

The body is painted buff with a red filling ring and Green ring with an overprint in black with the explosive letters if filled with RDX/BWX or PE. The designation is cast into one of the fins and the year of manufacture cast into the opposite fin. A manufactures mark will also be cast into the main body parts. The safety pin has a small tag attached which reads: "TO BE WITHDRAWN FROM GRENADE BEFORE FIRING".

Grenade, Rifle, No. 68 AT Mk. III

TYPE- Anti-Tank
WEIGHT- 1 lb. 15.5 oz.
LENGTH- 6.625 in.
DIAMETER- 2.5 in.
IGNITER- Impact

This grenade was officially introduced in November of 1940 along with the Mk. I and Mk. II. This date of introduction indicates that considerable resources and development was directed toward this grenade. The first grenades were being produced in May of 1940 and by November 1940, only 6 months later there had been two further Marks introduced. This indicates the importance placed on infantry antitank weapons during that period. This grenade was again declared obsolete in May 1945.



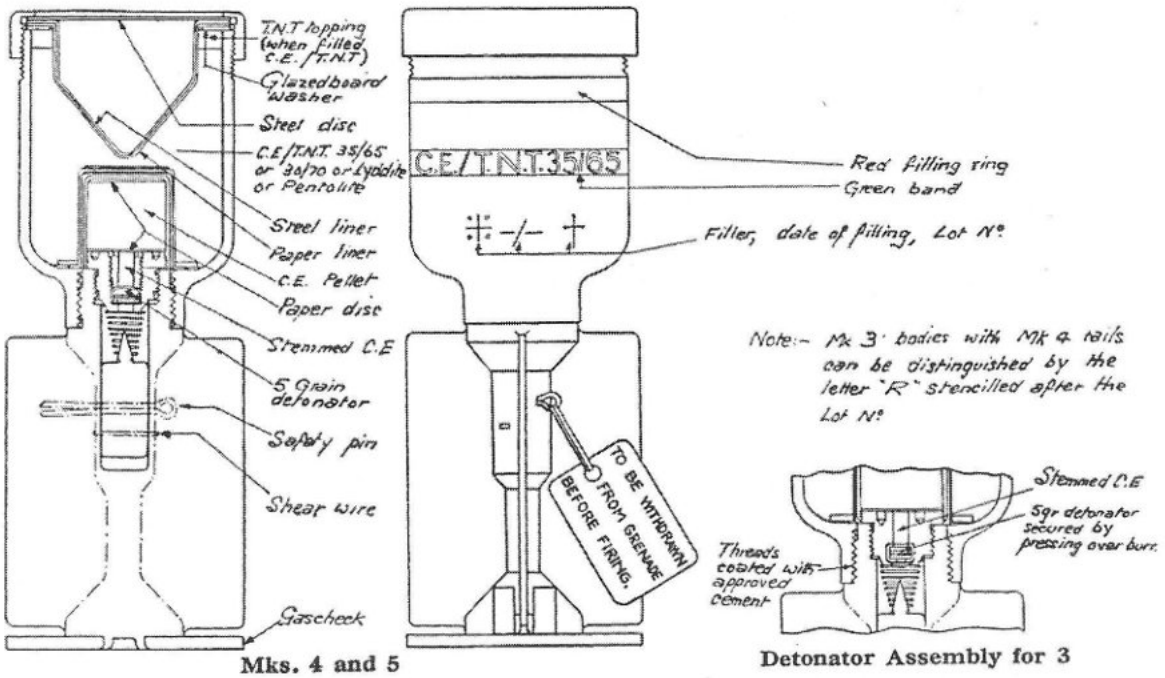
No. 68 Mk. III

The body style of the Mk. III is the same as the Mk. II but there are internal changes. This Mark uses a cylindroconical charge liner to improve on the performance of the earlier type. The detonator holder has a larger CE pellet. The detonator is fitted into the detonator holder and has the end of the detonator holder spun over to retain it in place. The gas check is made of steel and riveted onto the fin assembly or may be of Mazak cast integrally with the fin assembly. The integral gas check and fin assembly was approved for manufacture in April 1941. Mazak gas checks become brittle in temperatures of -20 and may break on firing. The safety pin has a tag attached that reads "TO BE WITHDRAWN FROM GRENADE BEFORE FIRING".

The method of retaining the detonator was found to be unsatisfactory giving rise to premature

detonations. For this reason all grenades of the Mk. III designation were refitted with a Mk. IV fin assembly. Grenades so modified are distinguished by the letter "R" after the lot number and are redesignated Mk. IV.

The body is painted buff with a red filling ring, a green band with superimposed black band denotes a filling of Pentolite and no band with black "LYD" indicates a filling of Lyddite. The designation is cast into one of the fins and the year of manufacture cast into the opposite fin. A manufacturers mark will also be cast into the main body parts usually found on the small reinforcing projections at the bottom of the fins.


T.N.T topping (when filled C.E./T.N.T.)
Glazedboard washer
Steel disc
C.E./T.N.T. 35/65 or 30/70 or Lyddite or Pentolite
Steel liner
Paper liner
C.E. Pellet
Paper disc
Stemmed C.E
5 Grain detonator
Safety pin
Shear wire
Gascheck
C.E./T.N.T. 35/65
Red filling ring
Green band
Filler, date of filling, Lot N°
TO BE WITHDRAWN FROM GRENADE BEFORE FIRING.
Note:- Mk 3 bodies with Mk 4 tails can be distinguished by the letter "R" stencilled after the Lot N°
Stemmed C.E
5gr detonator secured by pressing over burr
Threads coated with approved cement

Mks. 4 and 5 **Detonator Assembly for 3**

Grenade, Rifle, No. 68 AT Mk. IV

TYPE- Anti-Tank
WEIGHT- 1 lb. 15.5 oz.
LENGTH- 6.5 in.
DIAMETER- 2.5 in.
IGNITER- Impact
FILLING- 5.5 oz.

The Mk. IV is similar to the Mk. III but has had some improvements to the detonator holder. The detonator holder uses a metal plug to retain the detonator in place. The gas check is made of "Mazak" cast integrally with the fin assembly or is held on by a screw.

This designation also includes the Mk. III grenades that were are upgraded to the Mk. IV standards by refitting with the Mk. IV fin assembly.

The grenade is filled with Lyddite, Pentolite, or CE/TNT. The body is painted buff with a red filling ring, a green band with superimposed black band denotes a filling of Pentolite and no band with black or white "LYD" indicates a filling of Lyddite. A green band with overprinted CE/TNT 30/70 indicates a filling of CE.

Grenade, Rifle, No. 68 AT Mk. V

TYPE- Anti-Tank
WEIGHT- 1 lb. 15.5 oz.
LENGTH- 6.5 in.
DIAMETER- 2.5 in.
IGNITER- Impact
FILLING- 5.5 oz.

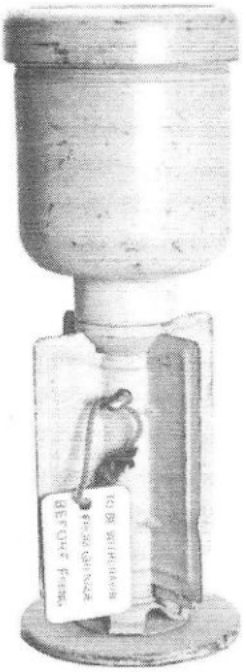
This grenade is basically the Mk. III grenade with the improvement to the detonator holder incorporated and using a steel gas check instead of the integral Mazak unit used with the Mk. IV.

Marking is as previously noted. The grenade is filled with Lyddite, Pentolite, or CE/TNT. The body is painted buff with a red filling ring, a green band with superimposed black band denotes a filling of Pentolite and no band with black or white "LYD" indicates a filling of Lyddite. A green band with overprinted CE/TNT 30/70 indicates a filling of CE.

Grenade, Rifle, No. 68 AT Mk. VI

TYPE- Anti-Tank
WEIGHT- 1 lb. 15.5 oz.
LENGTH- 6.5 in.
DIAMETER- 2.5 in.
IGNITER- Impact

The Mk. VI is a North American manufactured version of the Mk. V grenade. Some references state that it is manufactured in the United States but this is uncertain; it may be that it was manufactured in Canada only. The fin assembly is no longer cast but is a steel fabricated tail made up of a single diameter tube holding the striker mechanism and sheet metal fins. The fins are spot welded onto the tube. Actual functioning of the grenade is the same but the design has changed to make manufacture easier. The gas check is secured with a steel rivet.



No. 68 Mk. VI
Photo - Rick Larson

The designation, manufacturers mark and date of manufacture are stamped into one of the fins. Reinforcing lines are stamped into all the fins to give additional strength to the sheet metal fins. The grenade is painted buff with a red filling ring. A green band and letters identifying the filling are painted below the red filling ring.

Packing of the No. 68 grenade could be in either of three methods. Normal packing is in "Box P 59 Mk. 2" with each grenade in a paper cylinder. The box will contain 17 grenades with 20 launching cartridges. The other possible packing is 18 grenades with 20 launching cartridges or 18 grenades with no cartridges. The latter method is for grenades to be launched from the Northover projector.

The boxes will be marked with the quantity, Mark, Lot Number, date of filling, filler, and nature of filler of the grenades and details of the launching cartridges. Boxes marked a two-inch vertical red band on the sides and across the lid contain .30 cartridges. It will also be marked with "Cartridges .30 in." on both sides.

Experimental Plastic Version- In 1943 a plastic version of the No. 68, designed by a Major Thorp, was trialed. The grenade was also available with a fragmentation sleeve to enhance the antipersonnel effects. There were a couple of safety problems with this version which could have easily been fixed, but being 1943 it really came too late to be adopted due to the newer, more effective anti tank weapons being produced.

Grenade, Rifle, No. 68 Practice Mk. I

This is a drill version of the No. 68 manufactured specifically for the purpose. It appears to be based on the Mk. II but is manufactured specifically as a drill round. The outside appearance is identical to the live grenade but the closing cap for the head is a single steel piece instead of a ring and disc. It is internally threaded to match threads on the top of the body. There is no knurling on the edge of the cap. The base of the body is internally threaded to match threading on the fin assembly. Two holes are drilled in the side of the head to indicate a drill munition. A liner, made of a plastic material gives the grenade the same weight as a live grenade. The fin assembly is constructed in the same manner as the live version but is not threaded on the inside to fit an igniter mechanism. The grenade is not fitted with a striker. The steel gas check is held on with a brass bolt. A safety pin is fitted and has a tag on it, which reads: "TO BE WITHDRAWN FROM GRENADE BEFORE FIRING".

The grenade is painted white with the word "DRILL" stenciled in black on the head. The designation "No. 68 ATI/L" is cast onto one of the fins and the date of manufacture cast onto the opposite fin. A manufacturers mark will be found on a minimum of one body part if not more.

There were other drill units produced using the parts of the Mk. III grenade. These units are painted white with a black stenciled "Drill" around the body and stenciled on the two of the fins.

Grenade, Hand, No. 69

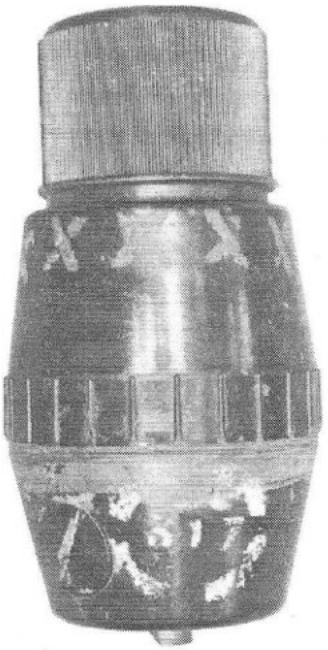
This grenade was introduced for service (officially) in December 1940. It was obsolete in British Service by 1947 due to its extremely low lethality. It was noted in the manuals that it was "introduced with the object of providing a light hand

percussion grenade for offensive action". It was also noted that the grenade could be used to add realism in training but must be thrown behind advancing troops, preferably behind banks and into ditches, as the lead ball was liable to fly out and cause injuries. The danger radius of the grenade was small and could be thrown from the standing position in the open. In Canadian Service it was not declared obsolete until 27 Feb 1950 but due to large stocks of the grenade on hand it was removed from the obsolete list on 31 March 1950 to continue in service until the stocks were depleted. It remained in Canadian Service past 1955; unfortunately the date it was finally declared obsolete is unknown. During the Second World War the Germans captured stocks of this grenade and designated it "Eihandgranate 324 (e)".

Grenade, Hand, No. 69 Mk. I

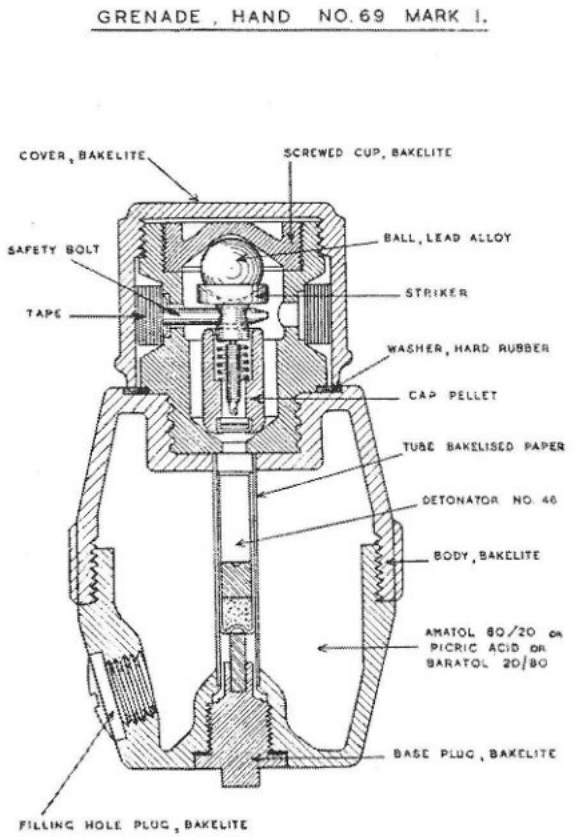
TYPE- Offensive
WEIGHT- 13.5 oz.
LENGTH- 4.5 in.
DIAMETER- 2.375 in.
IGNITER- No. 247
FILLING- 3.25 oz.

The main body of the grenade is made of bakelite in a barrel shape. The body is made in two parts, the top, which has a fuze well molded into the top and the bottom that has a filling hole on the side and a detonator well in the bottom. The two parts are screwed and cemented together in the center with a laminated plastic detonator tube cemented between the top and bottom and running completely through the centre of the grenade. The filling hole is closed by a bakelite closing plug and the detonator well closed by a bakelite base plug. It is noted in Regulations for Army Ordnance Services that later manufactured bodies, filling plugs, and base plugs were made of an approved moulded composition instead of bakelite.



No. 69 Mk. I
Photo - R. Leiendecker

The base plug has a rubber nipple inserted in its inner end to support the detonator in its proper position. It is screwed into the body with a rubber washer to provide a waterproof seal. The filling plug is also screwed into the body with a hard rubber washer but is normally cemented in place at the factory to prevent removal. A fuze, No. 247 is screwed into the top with a rubber washer providing a watertight seal of the grenade. The filling may be Picric Acid, Lyditte, Amatol 80/20, or Baratol 20/80.



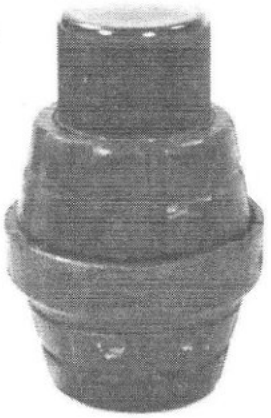
The grenade is unpainted with the body normally having a very dark brown or black appearance. A filling ring of red "X's" is painted around the top of the body and a green ring around the middle. The green ring denotes a filling of Amatol 80/20, a green ring with abbreviation of BAR 20/80 indicates a filling of Baratol, and no ring with LYD stenciled on the body indicates a filling of Lyditte. The body will be stamped or cast with the designation, manufacturers mark and year of manufacture on the bottom or possibly on the side.

Australian manufactured No. 69 Mk. I grenades are most often a red coloured bakelite instead of the normal black.

For use the grenade must first be primed by unscrewing the base plug and inserting a "Detonator No. 46" with the open end up then replacing the base plug and tightening it down. The grenade is then ready for use. The cap of the fuze is unscrewed and removed, the tape then being held in place by the thumb. When the grenade is thrown the tape will unwind eventually pulling out the safety pin. The fuze is then free to operate on impact.

In an attempt to increase the effectiveness of the grenade, two types of fragmentation sleeves were developed and trialed, one was smooth on the outside, the other externally segmented. These were simply

two pieces made to fit over the grenade and screw together in the centre. The top portion was fitted over the fuze mechanism leaving it free for use as normal. These fragmentation sleeves were not adopted for use.



No. 69 Mk. I with Frag Sleeve
Photo - Norman Bonney

Grenade, Hand, Drill, No. 69 Mk. I

The drill version of this grenade is made in the same manner as the live version. The "Fuze No. 247" is filled with a wooden insert instead of having the normal parts. The body is black with no coloured bands and the cap of the fuze is painted white to indicate drill.

Grenade, Hand, Anti-Personnel, No. 70

This grenade was designed to be replacement for the No. 36M Mk. I. It was designed in 1940 but no further serious work took place on the design until 1943. It was found in the hill fighting in the Far East that the fixed delay of the No.36M was dangerous to friendly troops. In an advance uphill, there was a danger of the grenade rolling back downhill and exploding amongst friendly troops. This produced a requirement for an impact fuzed fragmentation grenade that was to became the No. 70. The Mk. I designation was allotted to an experimental pattern which was not introduced for service. The Mk. 2 was officially introduced for service in November 1946 and declared obsolete in March 1956. Although not introduced until 1946 a number of grenades were produced in 1945 and sent to units in Burma for extended trials.

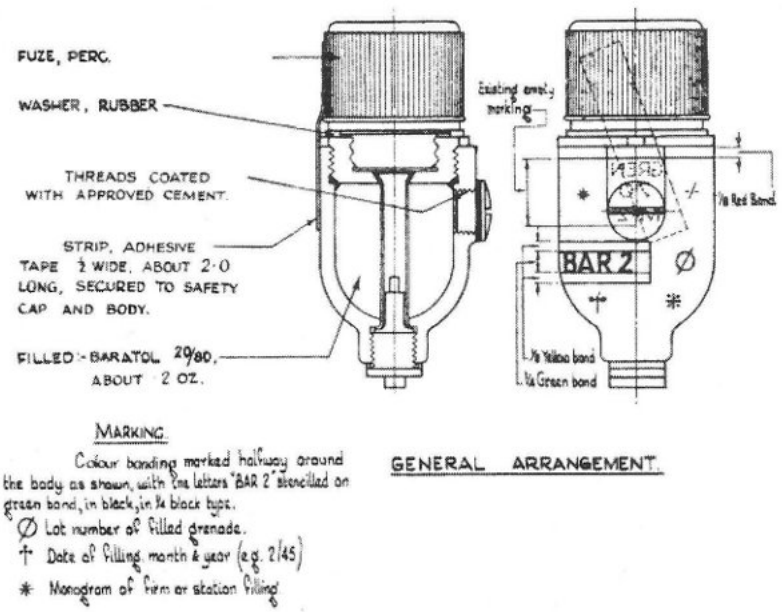
Grenade, Hand, Fragmentation, No. 70 Mk. I

This is the experimental version of the grenade, which was never introduced for service. Apparently during the experimental phase a model using a striker mechanism, similar to the No. 3 striker mechanim, and delay fuse was tested. This particular version was designed to prevent blinds where the ground was too soft to cause the impact igniter to function.

Grenade, Hand, Anti-Personnel, No. 70 Mk. 2

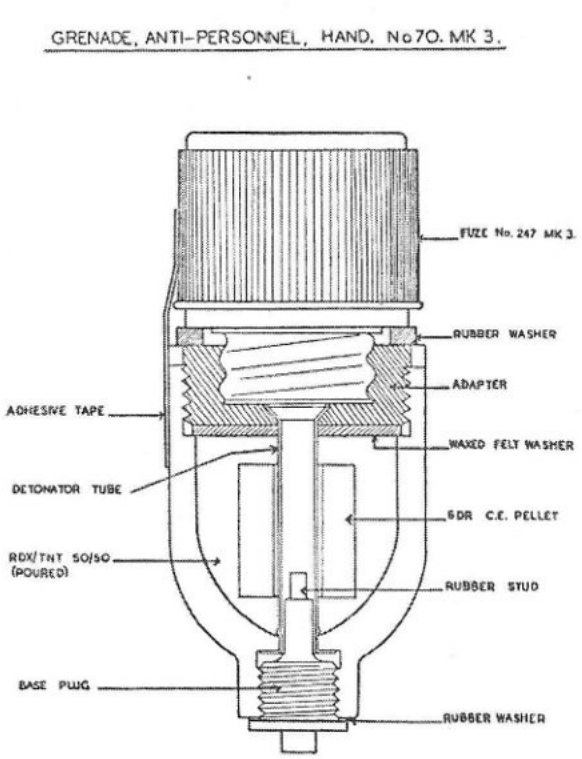
TYPE- Fragmentation
WEIGHT- 1 lb.
LENGTH- 4.125 in.
DIAMETER- 2 in.
IGNITER- No. 247
FILLING- 2 oz.

This was the first of the service grenades. The body is cast iron in a cylindrical form. A form of tail is cast on the bottom with an opening in the bottom of the tail, another in the side of the grenade and a large opening in the top. The top is closed by a fuze mechanism adapter. It screws into threads on the inside of the body and has the threads coated with approved cement to waterproof the joint. The opening in the side of the body is the filling hole and is internally threaded to accept a filling hole plug. The bottom opening is for the detonator tube and is closed by a bakelite base plug. A detonator tube runs from the bottom opening to the adapter screwed into the top. The base plug has a rubber nipple mounted on the inner projection that helps retain the detonator in place. A "Fuze No. 247 is screwed into the top adapter. The safety cap is retained in place by a strip of adhesive tape securing it to the body.


FUZE, PERC.
WASHER, RUBBER
THREADS COATED WITH APPROVED CEMENT.
STRIP, ADHESIVE TAPE ½ WIDE, ABOUT 2·0 LONG, SECURED TO SAFETY CAP AND BODY.
FILLED - BARATOL 20/80, ABOUT 2 OZ.
Existing ammty marking
BAR 2
½ Red Band
½ Yellow band
½ Green band
MARKING.
Colour banding marked halfway around the body as shown, with the letters "BAR 2" stencilled on green band, in black, in ¼ block type.
Ø Lot number of filled grenade.
† Date of filling, month & year (e.g. 2/45)
* Monogram of firm or station filling.
GENERAL ARRANGEMENT.

The grenade body is varnished with a red filling ring around the top and a green band painted halfway around the body. The letters "BAR 2" are stenciled on the band in black paint denoting a filling of Baratol 20/80. The body is also marked with the designation, lot number, manufacturers mark, and date of filling

The grenade must be primed prior to use, to prime the grenade, remove the base plug and insert a detonator with the open end up into the detonator sleeve. Screw the base plug back onto the grenade and tighten hand tight. The grenade is then primed. For use, unscrew the top cap of the fuze and hold the weight in place with the thumb, when the grenade is thrown, the natural gyrations of the grenade assist the tape in unwinding from around the fuze. When the tape is fully unwound it pulls the safety pin out of the fuze. When the grenade strikes the ground the fuze is free to operate and explode the grenade.



Grenade, Hand, Anti-Personnel, No. 70 Mk. 3

TYPE- Fragmentation
WEIGHT- 1 lb.
LENGTH- 4.625 in.
DIAMETER- 2 in.
IGNITER- No. 247
FILLING- 2 oz.

In the Mk. 3 version there a several modifications, the most noticeable being the absence of a filling hole in the side of the body. The main body is basically the same shape as the Mk. 2, is made of cast iron, but the filling hole has been eliminated. The fuze adapter is made of a zinc-based alloy, Mazak. The detonator tube is aluminum and is held in position by being spun into recesses in the adapter and base of the body. The joints are then sealed with R.D. cement No. 1.

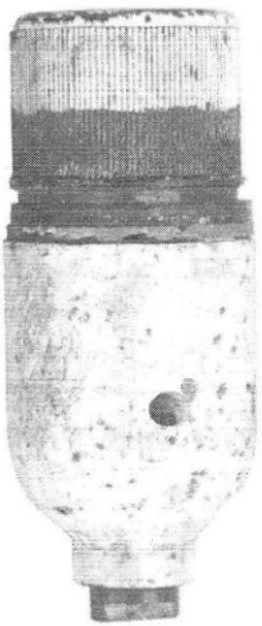
The grenade may be filled with RDX/TNT 50/50 poured, with a topping of TNT and a C.E. pellet to ensure complete detonation or a filling of cold stemmed Baratol 20/80. The exterior of the body is varnished and the designation is cast into the body. A red filling ring is painted just below the adapter. A green band edged in yellow or a blue band edged in yellow are painted on the body approximately centred on the body and running halfway around the grenade. The green band with "BAR 2" stenciled on it indicates a filling of Baratol, the blue band with "TNT 3" stenciled on it indicates a filling of RDX/TNT. In addition to those markings the lot number, filling station mark, and date of filling are stenciled on the body. The grenades are packed in a steel box with four inner containers. There are 3 grenades and small tin plate box for the detonators is contained within each inner container.

Grenade, Hand, Drill, No. 70 Mk. 3

TYPE- Drill
WEIGHT- 1 lb.
LENGTH- 4.625 in.
DIAMETER- 2 in.
IGNITER- No. 247 Drill

The drill version of the No. 70 Mk. 3 is constructed in the same manner as the live grenade. Two holes are drilled completely through the main body. The fuze is a "Drill Fuze, No. 247". This fuze outwardly looks like the live fuze but has no internal parts; instead the fuze is filled by a block of wood.

The body is painted white with the word "DRILL" stenciled on the body near the bottom. The upper half of the cap over the fuze is also painted white. Cast into the body around the bottom is the designation "GREN 70 MK3", manufacturers mark, and date of manufacture.



No. 70 Mk. 3 Drill

Grenade, Hand, Fragmentation, No. 71 Mk. I

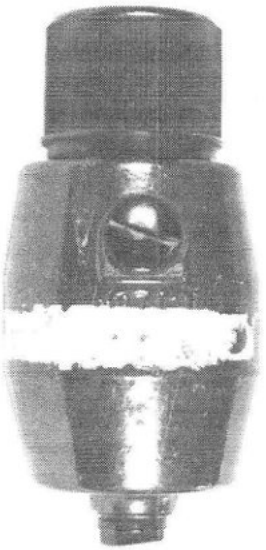
TYPE- Fragmentation
WEIGHT- 2 lb.
IGNITER- No. 247

This was an experimental grenade, designed in 1940 but not taken up. It was reconsidered in 1943 and 1944 but abandoned due to it being too heavy for effective throwing.

The body is made of cast iron and shaped in the barrel shape of the No. 69. An igniter well in the top of the body is roll threaded to accept a No. 247 fuze mechanism. A filling hole is located on the side of the grenade in the upper half of the body. The filling hole is closed by

a bakelite closing plug. A detonator well is located in the bottom of the grenade and closed by a bakelite base plug The outside of the body is varnished a dark brown colour similar to the finish on a No. 36M. The filling was Baratol or Lyddite. There are markings cast into the body around the centre of the grenade giving the designation. Live grenades would have a red filling ring and likely a green band to denote the filling of Baratol. Drill grenades have a white band painted around the centre of the body.

For use the grenade must first be primed by unscrewing the base plug and inserting a detonator with the open end up, replacing the base plug, and finally tightening it down. The grenade is then ready for use. The cap of the fuze is unscrewed and removed, the tape then being held in place by the thumb. When the grenade is thrown the tape will unwind eventually pulling out the safety pin. The fuze is then free to operate on impact.



No. 71 Mk. I
Photo - Norman Bonney

Grenade, Hand, AT, No. 72 Mk. I[L]

This one of the "Fear of Invasion" stores. It was designed as a glass anti tank grenade but was discontinued during production. It is assumed that sufficient quantities of the No. 73 and No. 74 grenades were produced thus reducing the need for the No. 72. No further information is currently available.

Grenade, Hand, No. 73, Anti-tank, Mk. I

TYPE- Anti-Tank
WEIGHT- 4 lb.
LENGTH- 9.5 in. body
DIAMETER- 3.25 in.
IGNITER- No. 247
FILLING- 3.25 lb.

This grenade was first introduced for service (officially) in November of 1940 and declared obsolete in October 1941. It was then reintroduced in March 1943 and finally declared obsolete in January 1943. I believe the reasons behind the reintroduction were; It was originally introduced as an anti tank grenade, when better anti-tank grenades were available for use this was declared obsolete, however while this grenade was not particularly useful as an anti-tank grenade, it made a good demolition charge due to its large explosive content. The reintroduction was most likely as a small demolition charge for the infantry to be used against pillboxes and dug in positions. Captured stocks were designated "Handgranate 340 (e)" by the Germans.

The body consists of a tinplate cylinder with the bottom permanently attached by rolling and soldering. The top is closed by a tin lid, which screws onto the cylinder using interrupted threads. The use of interrupted threads allows removal of the top to be accomplished quickly. A recess in the middle of the lid is roll threaded to accept the No. 247 Fuze mechanism forming a fuze housing. The fuze is cemented into position and is issued with the grenade. The detonator tube screws onto the bottom of the fuze housing on the bottom of the cap. The detonator tube has a hollow stem to accommodate the demolition type detonator, either a No. 8 or No. 6 commercial detonator. The No. 6 was original to the grenade but was relegated to practice use and the No. 8 designated as the live store. The filling is wrapped in two layers of manila or kraft paper and has a cavity formed in to top. When the lid is screwed onto the grenade the detonator container fits into the cavity in the filling. A thin greyboard disc is placed in the body below the filling and a felt disc is placed on top of the filling designed to absorb any possible exudation from the explosive filler. When issued, the lid is temporarily secured to the body by a strip of adhesive tape that also helps prevent moisture getting into the body.

No. 73 Mk. I
Photo - Norman Bonney

The body of the grenade is painted buff and has a red filling ring around the upper part of the body. The designation, manufacturers mark, lot number and date of filling are stenciled on the body as well as the type of filling. A filling of polar ammon gelatin dynamite is indicated by "P.A.G.D." or Nitro Gelatin by "N.G." being stenciled in black on the body.

For use the grenade must first be primed. The adhesive tape is removed from the cap and the cap removed. The detonator holder is unscrewed and the detonator inserted with the closed

end first. The detonator holder is then replaced and the cap screwed back onto the grenade. The lack of adhesive tape is then an indicator that the grenade may be primed. Early issues of the grenade had poor fitting lids and it was sometimes necessary to use the tape as packing to ensure the lid did not come off when throwing the grenade. Later issues remedied the problem. After priming the grenade is ready for use. To use the grenade, unscrew the safety cap and hold the tape down with a thumb or finger. When the grenade is thrown the tape will unwind eventually pulling out the safety pin. The fuze is then free to operate on impact.

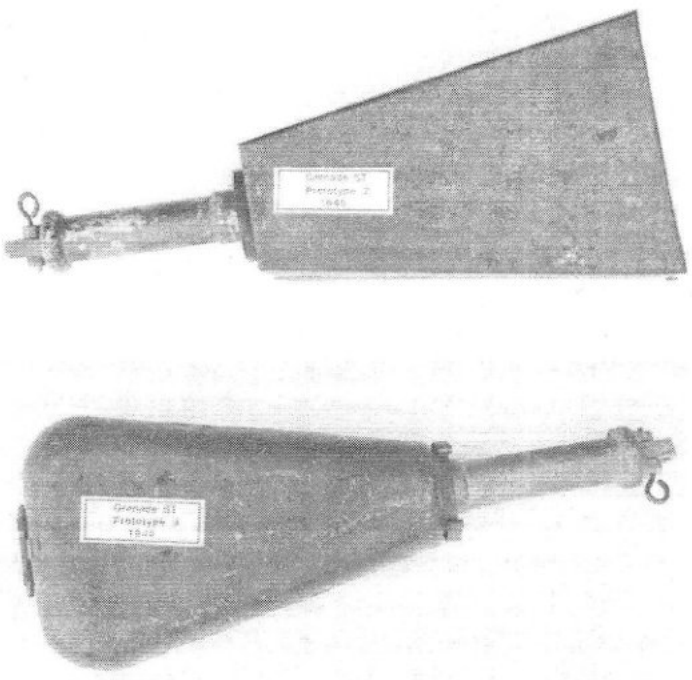
Grenade, Hand, Drill, No. 73, Anti-tank, Mk. I

The drill version of the No. 73 grenade is made in the same manner as a live grenade but has an inert filling and uses a "Drill Fuze, No. 247".

The body is painted white with markings in black. Markings give the designation and manufacturers marking. The grenade is not marked with a filling type.

Grenade, Hand, No. 74

The "Grenade, Hand, No. 74" had a rather interesting history. Early in the war it was noted that the British had no effective anti tank weapons to fight the German tanks with. The Boyes anti tank rifle was the accepted standard but had proven to be totally ineffective against the German armour. A new weapon was desperately needed. A department of the Ministry of Defence (M.D. 1) was given the task. After some initial ideas started by Sir Millis Jefferies (the director of MD1) the task was given to Lt. Col. Stuart Macrea to develop into a workable design. The initial trials had determined that what was needed was a grenade which could be thrown at a target and stick to it. The problem was that the charge needed to be a high velocity cutting charge meaning that the charge must poultice itself onto the target to be effective. Initial trials had involved filling some lengths of bicycle tire tubing with plasticine (to represent plastic explosive), fitting them with a wooden handle (representing the igniter assembly and providing a method to throw them), and dipping the tubing in a sticky rubber solution. The finished article had to be carried in a metal tube or it would stick to the operator. The results of these tests had been rather disappointing. Not only could the article not be thrown with any kind of accuracy but if they did hit the target they would not poultice onto it, nor would they stick to it. At this point, in July 1939, Lt. Col. Macrea was given the task to make it into a workable article.



Top- Grenade, ST, Prototype 2
Bottom- Grenade, ST, Prototype 3
Photos - Norman Bonney

Lt. Col. Macrea's first problem was to design something that could be thrown with some kind of accuracy. His first design consisted of a triangular bag shaped like a brickbat with a handle at the apex. The theory being that if the grenade could be thrown so it landed flat on the target there would be sufficient surface contact to make it effective. While in theory it was a wonderful idea, the resulting grenade could not be thrown with any accuracy. The next design went to a "cricket ball" about the size of a grapefruit with a handle. After making up some wooden dummies they found that this design could be thrown with reasonable accuracy. The next problem was to make it stick to the target and poultice onto it. At this point a flabby fabric bag filled with an almost liquid explosive was attempted. This attempt failed because the flabby bags could not be thrown with accuracy, the grenade must retain its shape when thrown and poultice onto the target after hitting it. The next design used a glass flask, filled with porridge for the throwing tests. This proved to be satisfactory for throwing but the charge splattered all over the place when the flask shattered. A simple solution was to put a sock over the flask, which worked perfectly. The next problem was the adhesive,

which had to hold an object weighing about one pound for several seconds and never dry out. A firm named "Kaye Bros Ltd." developed a suitable adhesive out of birdlime. To enable the device to be carried a cover consisting of two sheet metal hemispheres hinged by a spring loaded hinge was designed. This eventually became the Mk. I.

On January 30, 1940 tests of the "Sticky bomb" were satisfactory enough for the Prime Minister (Churchill) to want production to start. At this point the Ordnance Board got involved and declared it impossible to allow its use for a number of reasons. Official approval could not be obtained, but the Prime Minister wanted it, and on June 1, 1940, after being informed that official approval from the Ordnance board could not be obtained, he wrote a note on 10 Downing Street notepaper stating "Sticky Bomb. Make one million. WSC". The Director of Armaments and Ordnance board still declared that it was not approved and production could not be undertaken without interfering with vital work. At this point, MD1 offered to make them and was told that even if they did, it would still be unacceptable to the Army and could only be issued to the Home Guard. An Ordnance Board memo (Ordnance Board proceedings 827 September 1940) states, " The whole article is most objectionable". Production started at MD1. After several more go arounds with the Ordnance board and after a successful demonstration on April 29, 1941 in front of the Secretary of State for War the grenade was approved for issue to the Army as well as Home Guard on the Secretary's direction.

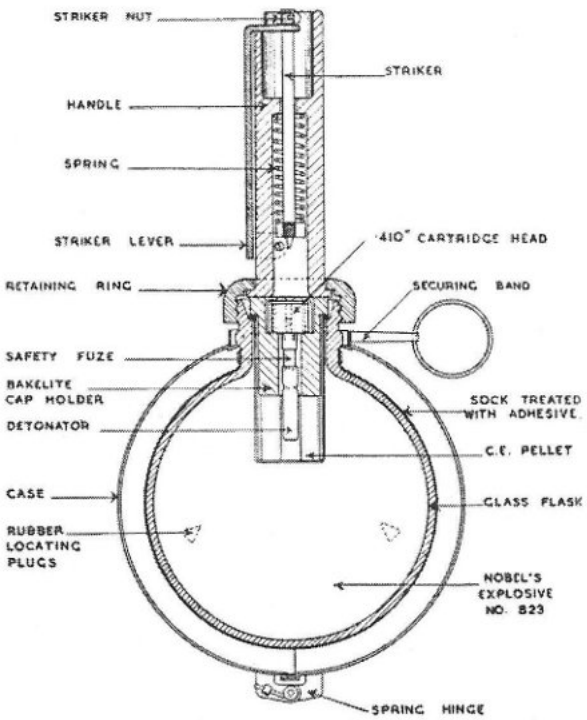
The Mk. I was never officially adopted but was declared obsolete in January 1946, the Mk. II in December 1951. While the Mk. II was not declared obsolete until 1951 it was not used after 1945.

Grenade, Hand, No. 74 Mk. 1

TYPE- Anti-Tank
WEIGHT- 2.25 lb.
LENGTH- 9.5 in.
DIAMETER- 4.5 in.
FUSE DELAY- 3-6 sec.
FILLING- 1.33 lb.

The main body is a spherical glass flask with the neck formed into screw threads. It contained a filling of 560 grams of Nobel's 823 (nitro glycerin). A tube designed to hold the detonator assembly is fitted into the neck of the flask and closed during storage by wooden and rubber discs. The outer surface of the body is covered with a stockinet type material impregnated with a strong adhesive derived from birdlime. The entire assembly is then encased in two thin sheet metal hemispheres that are hinged at the bottom and spring loaded. Rubber nipples attached to the cover prevent it from sticking to the adhesive on the body. A pin secures the cover around the head of the grenade. The handle, made of bakelite, contains the striker mechanism that is held secure by a sheet metal safety lever and safety pin. The safety pin has a tag attached which reads, "DANGER, DO NOT REMOVE THIS PIN UNTIL READY TO THROW GRENADE". A plastic connecting ring holds the handle onto the body flask.

No. 74 Mk. I
Photo - R. Gallogly



The detonator assembly consists of a percussion cap, 5-second fuze, detonator, and CE (Composition Exploding) pellet. Rubber rings around the assembly hold it securely in the tube when inserted in the grenade.

The outer casing is painted buff with a red filling ring on the upper half, just below the neck. The designation, type, mark, filling type, filler's initials, and date of filling are stenciled in

black on the outer casing. In addition the glass flask is embossed with the designation of the grenade.

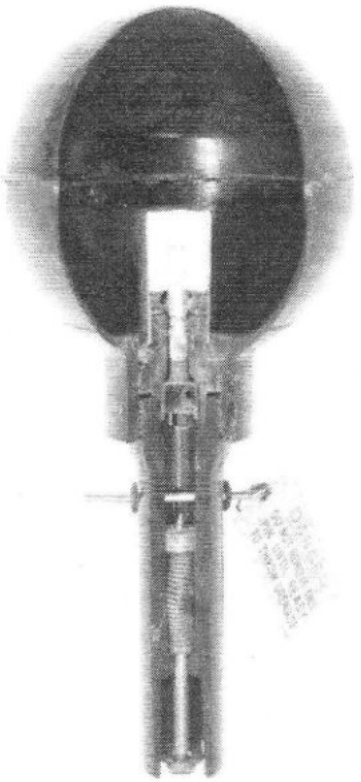
Prior to use, the grenade had to be primed, by unscrewing the connecting ring, removing the wooden and rubber discs, and inserting a detonator assembly into the tube. The handle was then attached and the connecting ring screwed firmly down. The grenade was then ready for use. These grenades were packed in metal cases holding 5 grenades and handles. The detonator assemblies are separately packed in a cardboard tube. Spring clips on the inside of the lid hold the cardboard tube containing 5 detonator assemblies.

The Mk. I was issued to troops in the Desert war proving to be very effective. Australian troops developed the most effective method of use. The troops would hide in ditches along the side of the road, waiting until an enemy tank came abreast of them. They would then jump up and slam the grenade onto the side of the tank, release the lever and pop back into the ditch. It was found that so long as the handle was pointed away from the operator, he need only be a few yards away from the blast to be completely safe from its effects.

Grenade, Hand, No. 74 Mk. 2

TYPE- Anti-Tank
WEIGHT- 2.25 lb.
LENGTH- 9.5 in.
DIAMETER- 4.5 in.
FUSE DELAY- 5 sec.
FILLING- 1.25 lb.

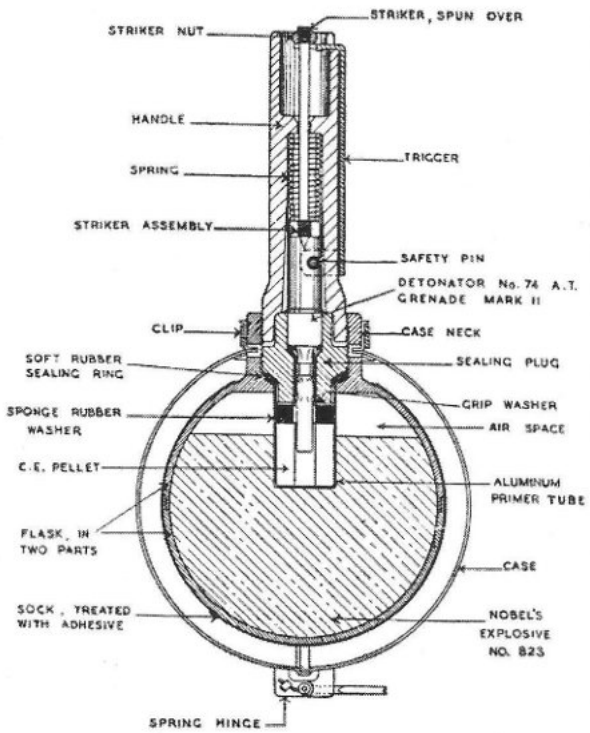
The body of the Mk. 2 is made of a plastic material, bakelite, and has at the top, a threaded well which fits the detonator assembly and the handle then screws into. This arrangement strengthened and simplified the attachment of handle to flask. The body is still covered with the stockinet material impregnated with adhesive. The body is then covered with a slightly redesigned type of cover, no longer held closed by a pin, but instead using a clip fitting around the top.



No. 74 Mk. II
Sectioned without outer casing
Photo - Norman Bonney

The handle contains the striker mechanism and is held safe by a sheet metal safety lever and safety pin that fits through projections on the lever and through the handle, blocking the striker. The handle screws directly into the flask.

The detonator assembly consists of a bakelite plug containing a 1.7 grain detonator instead of the percussion cap, 5-second fuze, No. 8 detonator, and has a tetryl booster on the bottom end. There were initially some problems with this detonator assembly. A machine in the factory was slightly out of adjustment and was not crimping the detonator securely to the fuze. This allowed the flash from the detonator to spark through to the No. 8 detonator bypassing the fuze and causing it to fire immediately. This problem was remedied by closer inspection of the machinery and assemblies and for good measure a rubber sleeve was added to both the joint of 1.7 grain detonator and the No. 8 detonator where they joined the fuze.



The outer casing is painted buff with a red filling ring located just below the neck. The designation, type, mark, filling type, fillers initials, and date of filling are stenciled in black on the outer casing.

Again, the grenade had to be primed prior to use. This was accomplished by removing the handle, inserting the detonator assembly, and replacing the handle.

Training Manual " S.A.T. Vol. I, Pamphlet No. 13, Grenade 1942", which calls it "The S.T. Grenade" gives the following instructions for use:

"The outer casing must be removed by pulling the pin or clip (NOT the one with tag marked "DANGER") with the grenade hanging down, when the casing will fall off. To use, pull out the safety pin, gripping the lever firmly against the handle with the fingers. It is difficult to throw the grenade accurately any distance. Far better results will be obtained by planting it on the object when circumstances permit. This must be done with sufficient force to break the flask. The lever must be released sharply. By moving about ten yards away the user is safe from the effects of the explosion."

The same manual notes that: "*The grenade will NOT stick on a sloping surface should it be wet, muddy, or oily*". The manual suggests the grenade was suitable for use at roadblocks, ambush positions, or for dropping from upstairs windows on to tanks or other AFV's. The grenade was useful during night raids on tank harbours. It was also noted the grenade was better employed like a small demolition charge by being placed in vulnerable positions rather than thrown.

The following is a copy of a report dated in 1941 sent from the Middle East to the War Office reporting on this grenade.

Report on Efficiency of S.T. Grenades against Enemy A.F.V.'s

The following tests were carried out with S.T. grenades against enemy A.F.V.'s.

1. *German Light Tank*

The grenade was thrown from about 10 yards and hit the tank below the gun turret and above the drivers seat. It blew a hole about 12" in diameter in the armour and rendered useless the brake and gear levers.

2. *German Tank (approx 9 tons).*

The Grenade was thrown from 7 yards and hit the tank below the gun turret and above the drivers seat. It blew a hole about 3" in diameter above the driver and split the welding for about 2 feet. It also loosened the bolts on the front visor protectors.

3. *Italian Medium Tank*
   - *(a) The Grenade was thrown from 5 yards and hit the turret of the tank. It blew a hole 6" in diameter and the pieces of shrapnel from the hole made many marks inside the turret.*
   - *(b) The Grenade was thrown from 5 yards at the drivers panel. It blew in the whole of the drivers panel and rendered unserviceable the brake and gear levers.*
   - *(c) The Grenade was thrown at the 2 pdr. gun emplacement which was splintered very badly and rendered unserviceable.*
   - *(d) It is considered that the S.T. Grenade would seriously wound the crew in this type of tank.*

4. *German Medium and Heavy Tanks.*
   - *(a) Tests on captured German Medium tanks disclosed that the grenades did no damage.*
   - *(b) A Patrol stalked a stationary German Medium tank during hours of darkness and captured the crew. Three S.T. Grenades were placed on the tank and the patrol withdrew. There was a loud explosion and the tank was seen to burst into flames. The flames were confirmed by other posts on the perimeter. It was assumed by the patrol that the tank was burnt out but this was not confirmed.*

It is considered that the S.T. Grenade is only effective against German and Italian Light tanks and A.F.V.'s, and Italian Medium tanks. Care must be taken in assembling the Grenade, so that the elastic band around the exploder is not disturbed and that the handle is screwed securely to the Grenade, otherwise the Grenade will not explode.

Care must be taken in throwing the Grenade, to see that it is aimed at a vulnerable part of the tank. To ensure effectiveness the grenade should be thrown from within 10 yards.

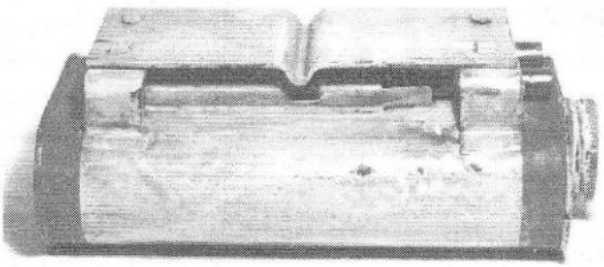
There is no danger to the person throwing the grenade if he is more than 5 yards from the explosion.

Grenade, Hand, No. 75, Anti tank (Hawkins)

The No. 75 grenade is in actual fact a small anti tank mine, or anti vehicle mine. There was not enough explosive in an individual mine to cause serious damage to a tank or more correctly the heavier tanks produced later in the Second World War but would seriously damage or destroy wheeled vehicles. The Mk. I was officially introduced for service in June 1942 but was likely in actual service before that date. It was declared obsolete in March 1946. The Mk. II was introduced in June 1943 and declared obsolete in July 1955. The Mk. III had a slightly more interesting history, it was not officially introduced during the war but was declared obsolete in December 1945, then reintroduced in March 1949 and in November 1953 its use was extended to Naval Service. It was finally declared obsolete in July 1955.

Grenade, Hand, No. 75, Anti-tank, Mk. I

TYPE- Anti-Tank
WEIGHT- 2.25 lb.
LENGTH- 6.5 in.
HEIGHT- 1.875 in.
WIDTH- 3.625 in.
IGNITER- Chemical crush
FILLING- 1.74 lb.



No. 75 Mk. I
Photo - Bob Perkins

The body is a 1-pint capacity flat tin with a short neck and screw cap at one end. The detonator holder is formed from tinplate folded to form two detonator pockets and then soldered to the centre of the body. Slots are cut into the two pockets on the upper side and a tab on the ends of the pockets can be folded over to retain the igniters when fitted. Two striker plate brackets are soldered to either end of the body. Tabs on the brackets fit through holes in the striker plate and are then turned over to retain it in place. The striker plate is steel and is formed with a transverse groove in the centre. The groove forms a projection on the underside, which becomes the striker and is positioned over the slots in the detonator holder.

The filling was lightly stemmed in positions in three or four increments and waterproofed by inserting a waxed felt washer below the screw cap that was then cemented on. There were a number of fillings used with the grenade. Originally the fillings were Nobel's Explosive No. 704B, Nobel's Explosive No. 704B plus four exploders, Burrowite plus four exploders, or Military Ammonal plus four exploders. In the latter case the grenade is known as the No. 75A. The fillings were changed to: Nobel's Explosive No. 704B plus four exploders, Burrowite plus four exploders, or one third Burrowite and two thirds Nobel's Explosive No. 704B. The exploders used are cylindrical pellets seven-eighths inch diameter and 3 inches long that are wrapped in wax paper. They are placed transversely at the base of the body directly under the detonators. Exploders have been made from Nobel's Victor powder, Nobel's Explosive No. 673, or Polar Dynamite. With the later fillings only Polar Dynamite was used for the exploders.

The detonator assembly consists of an "Igniter, No. 75 grenade, Mk. II and a No. 27 detonator. The igniter is a chemical igniter. It consists of a tinplate tube closed at one end by flattening the tube. A circumferential groove is formed on the inside of the tube about half way down the tube. A lead washer is pressed into the groove on the inside of the tube. The hole in the washer is filled with a composition of potassium chlorate, sugar, and charcoal. A small glass vial containing a mixture of 93% sulphuric acid and 7% nitric acid is contained above the washer in the closed end of the igniter. The nitric acid lowers the freezing point and ensures better functioning at low temperatures. Cotton wool packing protects the vial. A thin rubber sleeve is rolled onto the open end of the igniter to provide a means of attaching the detonator. The flattened end of the igniter is painted red.

The grenade is painted buff. When the exploders used contained Victor powder or Nobel's Explosive No. 673 there is a red filling ring painted around the neck below the screw cap. When the exploders are Polar Dynamite the red ring is replaced by a ring of red "X's". The designation and normally a manufacturers mark are embossed in the side of the grenade. A date of manufacture is also embossed in the body. Filling details will be stenciled on the base of the grenade. A filling of Nobel's Explosive 704B is denoted by a stenciling of "704B", Burrowite by "BUR", and Military Ammonal by the letter "A". If the filling is 1/3 Burrowite and 2/3 704B the stenciling will be "1/3 BUR 2/3 704B". If fitted with exploders the stenciling will also have "& 4 EXPRS". In addition, when filled with Burrowite or Military Ammonal the cap will be painted pink.

For use, the igniter must be prepared by inserting a No. 27 detonator in the open end of the igniter until it meets the lead

washer. The open end of the detonator must be put in first. The rubber sleeve is then rolled down to hold the detonator in position. The assembled detonator assembly is then inserted into one of the igniter pockets of the grenade with the flattened end out. The metal tab on the grenade is then bent in to hold the igniter assembly in position. The operation is repeated for the other igniter pocket. When the igniters are properly inserted the glass vials are directly under the slots in the igniter pocket and the striker. The grenade can then be laid as an anti-tank mine or thrown in the path of a vehicle. The weight and shape of the grenade ensure that on reasonably flat ground the grenade will come to rest on one of the flat surfaces. When the grenade is run over on either side, the striker plate crushes and comes into contact with the igniter assemblies. This crushes the glass vials allowing the acid to come into contact with the composition in the lead washer. A chemical reaction occurs and a flash is produced which initiates the detonator. The detonator ignites the main filling.

It was noted that one grenade, if run over well, would break the track of a PzKw. III or PzKw IV but if heavier tanks were encountered a composite charge of three or four grenades would be necessary.

The Mk. I grenade had several defects. The striker plate assembly was comparatively weak. If the grenade was thrown on rough, rocky ground and fell with the striker plate down, the striker may be forced down enough to crush the igniter and cause detonation. There was a lack of support under the igniters. Pressure could distort the mine before the igniters fired and cause a loss of explosive power. The igniter, although suited for rapid and easy production, was not satisfactory for service conditions due to the danger of the glass bulb cracking spontaneously.

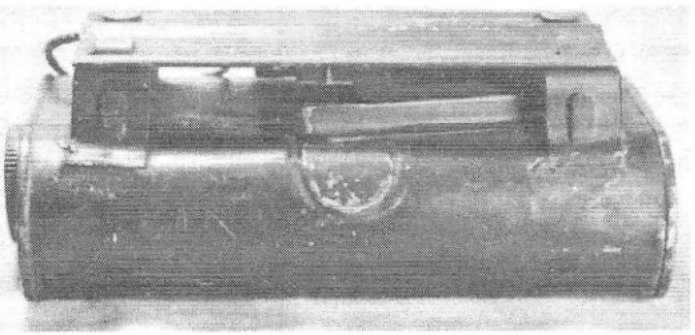
Grenade, Hand, No. 75A, Anti-tank, Mk. I

This is simply the Mk. I grenade filled with Military Ammonal and four exploders.

Grenade, Hand, No. 75 Anti-tank, Mk. II

TYPE- Anti-tank
WEIGHT- 2 lb. 4 oz.
LENGTH- 7.25 in.
HEIGHT- 2.76 in.
WIDTH- 3.6 in.
IGNITER- Chemical crush

This version was an improvement on the Mk. I to correct some of the defects of the original grenade. The body is the same as the Mk. I and in fact may have the Mk. I designation embossed on the body. The igniter holder has been modified to have two inclined pockets to give more reliable initiation by having the two detonators close together so that the detonation of one will cause the detonation of the other. The tabs at the open ends of the igniter sockets have holes to take a soft wire pin, attached by a cord to the body, which holds the detonators in position. The body is strengthened directly under the head of the detonators by having a saddle piece soldered on. The central bridge of the saddle piece lies between the open ends of the igniter pockets and prevents sideways movement of the detonators. The striker plate has been strengthened by using stronger support brackets and having a longitudinal corrugation projecting out from the body. The tabs on either side of the support brackets are designed to take a length of signal cable or strong cord so that several grenades could be strung together to form a necklace.



No. 75 Mk. II
Photo - Rick Larson

The filling is as for the Mk. I. The exploders used with the Mk. II are Polar Dynamite containing 25% nitroglycerine.

The "Detonator, No. 83 Mk. I" was formerly known as the "Igniter, Special, No. 1 Mk. I. It is of the percussion type overcoming the problems experienced with the chemical crush type used in the Mk. I grenade. The body is of molded plastic with two holes drilled in it. One hole, drilled completely through end-to-end takes a glass capsule filled with an igniferous detonator composition. The other hole, drilled from the top to meet the other hole, takes a steel pin that acts as a striker. The glass capsule is sealed in position by a sealing compound. The steel striker pin is also sealed in position. The other end of the plastic body has a spigot to take a No. 27 detonator that is cemented on.

The body is painted brown with two red "X's" painted either side of the filling cap. The filling details are stenciled in the

same manner as the Mk. I. The designation, date of manufacture, and manufacturers mark are embossed on the body. This particular grenade may have the designation embossed as Mk. I. This being because the original tins of the Mk. I continued to be used until they were gone.

Grenade, Hand, No. 75, A.T., Mk. 3

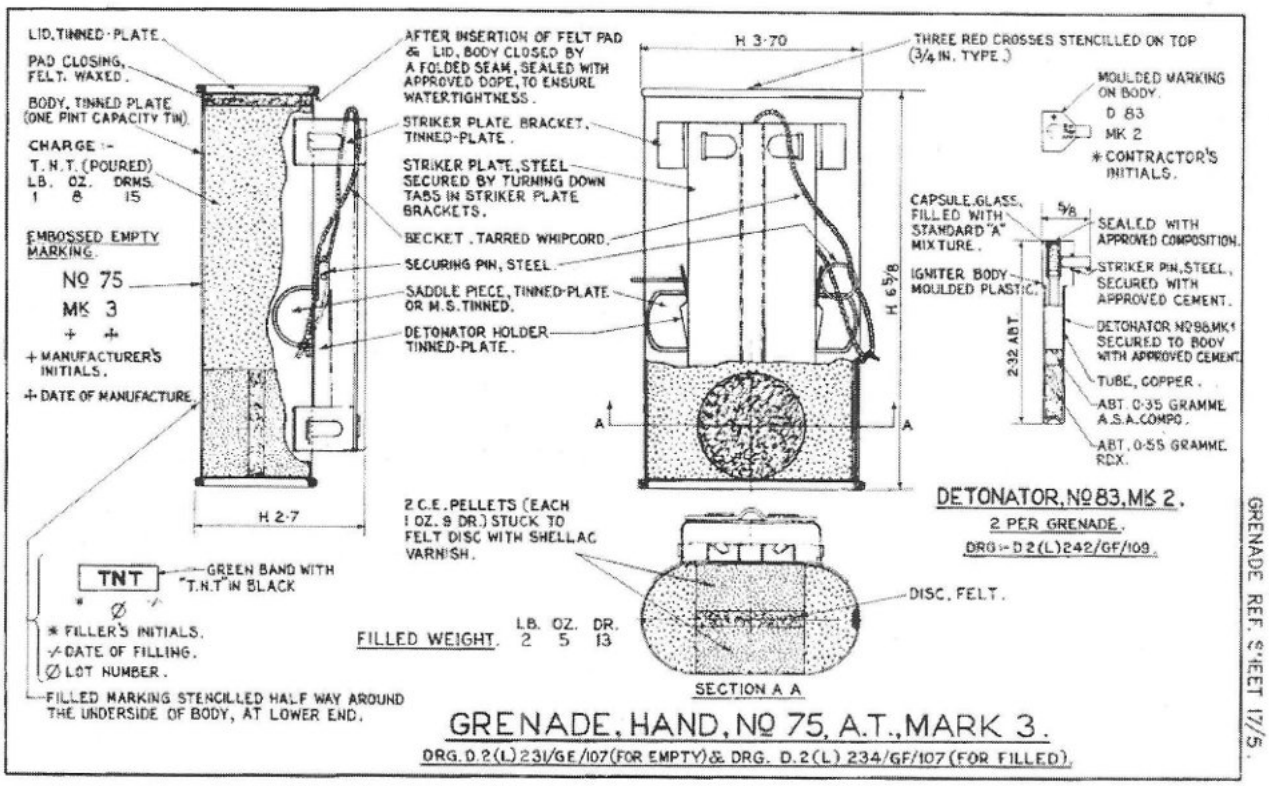
TYPE- Anti-tank
WEIGHT- 2 lb. 5 oz. 15 drams
LENGTH- 6.625 in.
HEIGHT- 2.7 in.
WIDTH- 3.7 in.
IGNITER- Chemical crush
FILLING- 1 lb. 8 oz. 15 drams

The body of the Mk. 3 is different from earlier marks in that it does not have the filling cap on the end. The body is a one pint capacity tinned plate tin. A tinned plate saddle piece is soldered on the upper side of the body to provide reinforcement under the detonators. Two detonator holders are soldered on top of the saddle piece angled slightly outward. Two striker plate brackets, also made of tin plate, are soldered near the ends of the grenade body. The striker plate, made of steel, is attached to the brackets by turning over tabs on the bracket that fit through slots on the striker plate. A steel securing pin fits through the end tabs on the detonator holders to retain the detonators in place when fitted. A tarred whipcord becket attaches the securing pin to the grenade body.

The detonator used with this grenade is the "Detonator No. 83. Mk. 2". The detonator has a body of moulded plastic containing a steel striker and a glass capsule filled with an ignition compound. A "Detonator No. 98 Mk. 1 is secured to the body with cement. Moulded markings will be found on the end opposite the detonator giving the designation and manufacturers mark.

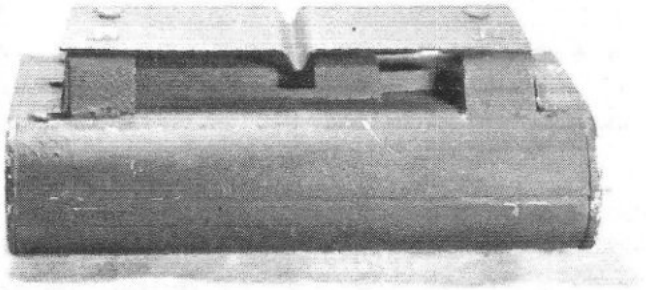
The grenade is filled with 2 C.E. pellets, separated by a felt disc, located at the bottom of the body where the detonators would lay. The remainder of the body is filled with 1 pound 8 oz. 15 drams of poured TNT. After filling, a waxed felt closing pad is placed over the explosive and the lid put on. The lid is closed by a folded seam and sealed with an approved dope to water proof the grenade.

The grenade is painted buff with three red "X" stenciled on the lid. The bottom side, opposite the striker plate, has all other markings. Embossed markings, relating to the empty grenade, give the designation, manufacturers initials, and date of manufacture. Filling details are stenciled below the embossed markings. There is a green band with "TNT" marked in black on it. Other filling details given are the fillers initials, date of filling, and lot number of the grenade.


LID, TINNED-PLATE.
PAD CLOSING, FELT. WAXED.
BODY, TINNED PLATE (ONE PINT CAPACITY TIN).
CHARGE :-
T.N.T. (POURED)
LB. OZ. DRMS.
1 8 15
EMBOSSED EMPTY MARKING.
Nº 75
MK 3
+ MANUFACTURER'S INITIALS.
÷ DATE OF MANUFACTURE.
AFTER INSERTION OF FELT PAD & LID, BODY CLOSED BY A FOLDED SEAM, SEALED WITH APPROVED DOPE, TO ENSURE WATERTIGHTNESS.
STRIKER PLATE BRACKET, TINNED-PLATE.
STRIKER PLATE, STEEL SECURED BY TURNING DOWN TABS IN STRIKER PLATE BRACKETS.
BECKET, TARRED WHIPCORD.
SECURING PIN, STEEL.
SADDLE PIECE, TINNED-PLATE OR M.S. TINNED.
DETONATOR HOLDER TINNED-PLATE.
H 3·70
H 2·7
H 6⅝
THREE RED CROSSES STENCILLED ON TOP (¾ IN. TYPE.)
MOULDED MARKING ON BODY.
D 83
MK 2
* CONTRACTOR'S INITIALS.
CAPSULE, GLASS, FILLED WITH STANDARD "A" MIXTURE.
IGNITER BODY MOULDED PLASTIC.
⅝
SEALED WITH APPROVED COMPOSITION.
STRIKER PIN, STEEL, SECURED WITH APPROVED CEMENT.
2·32 ABT.
DETONATOR Nº 98 MK 1 SECURED TO BODY WITH APPROVED CEMENT.
TUBE, COPPER.
ABT. 0·35 GRAMME A.S.A. COMPO.
ABT. 0·55 GRAMME RDX.
DETONATOR, Nº 83, MK 2.
2 PER GRENADE.
DRG :- D.2(L)242/GF/109.
2 C.E. PELLETS (EACH 1 OZ. 9 DR.) STUCK TO FELT DISC WITH SHELLAC VARNISH.
DISC, FELT.
TNT
GREEN BAND WITH "T.N.T" IN BLACK
* FILLER'S INITIALS.
÷ DATE OF FILLING.
Ø LOT NUMBER.
FILLED MARKING STENCILLED HALF WAY AROUND THE UNDERSIDE OF BODY, AT LOWER END.
FILLED WEIGHT. LB. OZ. DR. 2 5 13
SECTION A A
GRENADE, HAND, Nº 75, A.T., MARK 3.
DRG. D.2(L)231/GE/107 (FOR EMPTY) & DRG. D.2(L)234/GF/107 (FOR FILLED).
GRENADE REF. SHEET 17/5.

Grenade, Hand, No. 75 Drill, Anti-tank, Mk. I

This grenade is made in exactly the same manner as the live grenade but is filled with a sand/sawdust mixture and is painted a brownish-red colour to designate it as a drill store.



No. 75 Mk. I Drill
Photo - Rick Larson

Grenade, Hand or Projector, No. 76

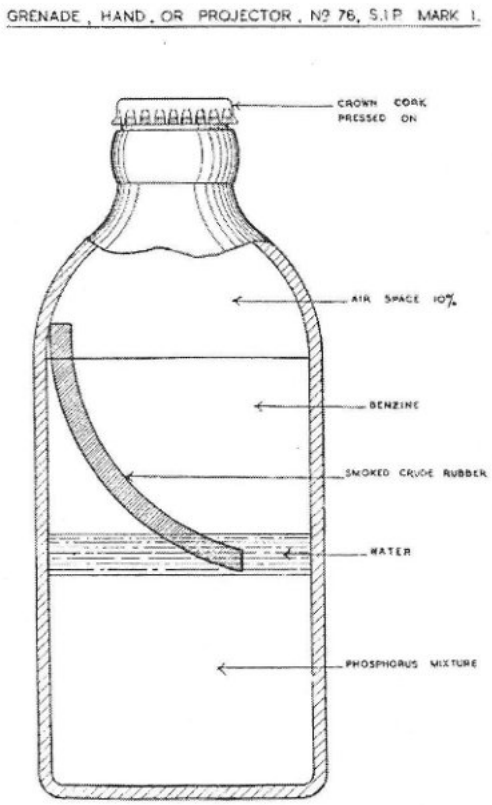
This grenade was never formally adopted for use; at least no date is recorded of its acceptance. It was, however, declared obsolete in February 1944. The grenade was originally known as the "A.W. Bomb" for Allbright and Wilson, its developer and manufacturer. It later became known as the " Grenade, S.I.P" (Self Igniting Phosphorous). It was designed as an anti tank device which, when thrown against an A.F.V., would produce an incendiary and smoke effect. Originally designed for hand use it was later adapted for use with the Northover Projector. Used mainly if not wholly by the Home Guard.

Grenade, Hand or Projector, No. 76, S.I.P. Mk. I

TYPE- Anti-Tank
WEIGHT- 19 oz.
LENGTH- 6 in.
DIAMETER- Normally 2.5 in.
IGNITER- Self Igniting

The grenade consists of a short-necked 1/2 pint capacity bottle filled with a mixture and closed with a crown cap. The filling consists of a mixture of yellow phosphorous (128 cc), water (21 cc), benzine (110 cc), and 3.5 inch piece of crude rubber. A 10% air space is left in the bottle to allow for expansion. The rubber strip partially dissolves during storage to give an adhesive quality to the mixture.

Grenades with a red crown cap were produced between August and October 1940 using bottles of varying dimensions. These grenades were suitable for hand use only.



Grenades with a green crown cap, if undated, were produced between November 1940 and May 1941. This version has bottles of a standard diameter (2.5 inches) and can be used with the Northover projector. After June 1, 1941 all No. 76 grenades were packed in boxes marked with the month and year of filling.

The charge for the Northover projector consists of a small charge of gunpowder in a disc shaped cellophane container protected by millboard discs. A sorbo-rubber pad or rubber ring 1/2 inch thick and 1 1/2 inches diameter if fitted to one end of the container to form a buffer between the charge and bottle. This prevents the bottle breaking on firing. A percussion cap is used to initiate the gunpowder charge.

When the bottle strikes its target and shatters, an instantaneous ignition takes place producing a cloud of screening smoke containing phosphorous pentoxide and sulphur dioxide and an incendiary effect. These fumes are noxious and would force the crew of an AFV to don respirators reducing the effectiveness of the AFV. At the same time the incendiary effects may cause them to abandon the vehicle and if the grenade strikes in a vulnerable spot on the AFV it could in fact destroy the vehicle. If a slight delay in ignition of the grenade is desired, vigorous shaking of the bottle before throwing will cause a small delay.

Grenade, Hand or Projector, Drill, No. 76

In addition to live grenades, there are drill versions of the No. 76 grenade for use with the Northover Projector. The earliest versions were made of

wood in a bottle shape and are weighted with steel or perhaps lead. These were only produced in experimental quantities. The next type was wooden in a cylindrical shape and is weighted with steel or lead. The regular drill projectile is made of rubber in a bottle shape. The top is marked "Northover Projector Drill Projectile". The drill projectiles are normally found painted red although they may also be found in white. The main producer of the drill projectiles was the "Bisley Clay Target Company".

Grenade, Hand, No. 77 Smoke

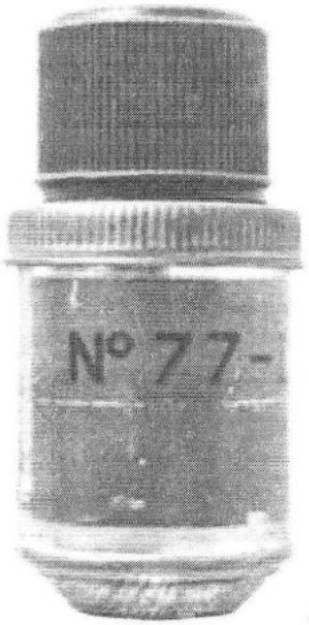
The No. 77 grenade was issued in two Marks, the Mk. I was officially introduced for service in February 1943 and the Mk. II in January 1943. Note the dates, the Mk. I was actually introduced after the Mk. II. The reason for the discrepancy is the Mk. II was originally designated as the No. 93 but had its designation changed by Ordnance Board proceeding 34159 of 31-12-46. In British Service the Mk. I was declared obsolete in March 1948, the Mk. II in January 1946. In Canadian service, the No. 77 Mk. 1 continued in use until the mid 1950's, it was classified limited standard in 1954 when the No. 80 was classified standard. The Mk. II was also classified limited standard for training only. In a survey taken after VE day of all the Commanders of the Canadian First Army, it was stated that the employment of the No. 77 Mk. I was almost entirely for A/Per and incendiary effects. On the few occasions in which it was used for smoke it was due to support fire from mortars or artillery not being immediately available. The Germans did capture stocks of this grenade during the war. For German use its designation was "Brandhandgranate (Ph) 753 (e)".

Grenade, Hand, No. 77 Smoke, W.P., Mk. I

TYPE- Smoke, WP
WEIGHT- 13.5 oz.
LENGTH- 4.65 in.
DIAMETER- 2.3 in.
IGNITER- No. 247
FILLING- 8 oz.

The body is basically cylindrical with folded seams. The bottom is in the form of a truncated cone and has the filling hole located in the centre of the bottom. The seam between the body and bottom is rolled and soldered to give an airtight seal. A tinplate plug soldered into position closes the filling hole. The top is recessed into the body and is provided with a threaded recess in the centre with a detonator sleeve soldered into the centre of the recess and extending down into the body. The top is again rolled and soldered into position to provide an airtight seal.

A fuze holder with milled skirt has a projection on the bottom to fit the threads in body. A hole in the centre of the projection allows the passage of the flash from the igniter mechanism. The fuze is the No. 247 Mk. I as used in the No. 69 grenade that is cemented into position sealing the joint from moisture. A waxed chipboard washer between the top of the grenade and the fuze holder seals that joint against moisture. Two types of detonators are used, either the No. 63 Mk. I with a filling of A.S.A./C.E. in an aluminum casing or the No. 63 Mk. II with a fulminate filling and copper casing. A strip of adhesive tape prevents the cap of the fuze mechanism from turning.



No. 77 Mk. I
Photo - P. Ritchie

The grenade is filled with approximately 8 oz. of white phosphorous. It is painted green and has "PHOS" stenciled onto it. Other markings include the designation, fillers initials, date of filling, and lot number. Strangely this grenade does not have a red filling ring, as is the normal practice.

For use the grenade must first be primed. The fuze holder is unscrewed and the detonator inserted with the closed end first into the detonator tube. The fuze holder is then screwed back into position and the grenade is then considered primed. The cap of the fuze is unscrewed and removed, the tape being held in place by the thumb. When the grenade is thrown the tape will unwind eventually pulling out the safety pin. The fuze is then free to operate on impact. When the fuze operates a flash from the fuze travels through the hole into the open end of the detonator. The detonator goes off and scatters the white phosphorous filling providing an instantaneous smoke screen. By nature of the filling the grenade also has a limited anti personnel effect and an incendiary effect.

After the war, these grenades in British use were found to be deteriorating in storage, this resulted in them being declared obsolete and stocks were destroyed due to the danger presented. The Canadians inspected the grenades they had in

storage (several hundred thousand). These were of Canadian manufacture. The same deterioration problem was not found in the Canadian grenades. In a report dated May 11 1948 it was noted: *"Canadian production was superior to that carried out in the U.K., inasmuch as the tinplate used in the construction of the Grenade was of a higher quality than that obtainable in the U.K. during the war. Further, the Inspection Board insisted upon 100% washing of Grenades, after soldering, with a 10% solution of aqua ammonia in order to remove all chlorides; this was followed by an acid-silver nitrate test conducted on representative samples selected from each washed batch to ensure freedom from chlorine. At a later stage in production, zinc chloride flux was banned, being substituted by resin alcohol flux."*

Grenade, Hand, No. 77, Smoke, Mk. I/I

This grenade differs from the Mk. I only in the body. The body is formed in one piece by deep drawing instead of the built up design in the Mk. I.

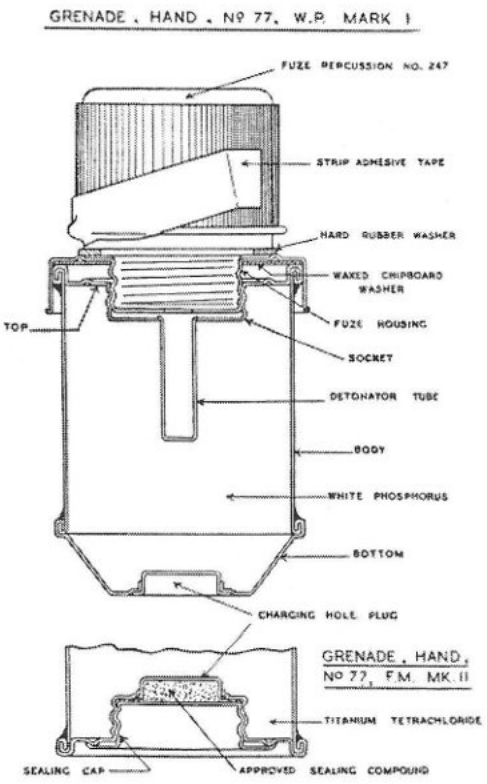
Grenade, Hand, No. 77, Smoke, F.M. Mk. II

TYPE- Smoke, Screening
WEIGHT- 13.5 oz.
LENGTH- 4.65 in.
DIAMETER- 2.25 in.
IGNITER- No. 247
FILLING- 8 oz.

The body of the Mk. II is completely cylindrical. The bottom is closed by a flat base, rolled and soldered in position, with a threaded recess in the centre. The filling hole is located in the centre of the recess. The filling hole is closed by a tinplate plug with a sealing compound on top. A sealing cap is then screwed down on top of it completing the seal.

The top is recessed into the body and is provided with a threaded recess in the centre with a detonator sleeve soldered into the centre of the recess and extending down into the body. The top is again rolled and soldered into position to provide an airtight seal.

No. 77 Mk. II
Photo - Rick Larson



A fuze holder with milled skirt has a projection on the bottom to fit the threads in body. A hole in the centre of the projection allows the passage of the flash from the igniter mechanism. The fuze is the No. 247 Mk. I cemented into position to seal the joint from moisture. A waxed chipboard washer between the top of the grenade and the fuze holder seals that joint against moisture. Two types of detonators are used, either the No. 63 Mk. I with a filling of A.S.A./C.E. in an aluminum casing or the No. 63 Mk. II with a fulminate filling and copper casing. A strip of adhesive tape prevents the cap of the fuze mechanism from turning.

The filling is "F.M." (titanium tetrachloride). The grenade is painted green with a white over red band around the middle. The designation, fillers initials, date of filling and lot number is stenciled on the body.

For use the grenade must be primed. The fuze holder is unscrewed and the detonator inserted with the closed end first into the detonator tube. The fuze holder is then screwed back into position and the grenade is ready for use. The tape on the cap is removed and the cap unscrewed and removed, the tape being held in place by the thumb. When the grenade is thrown the tape will unwind eventually pulling out the safety pin. The fuze is then free to operate on impact. When the fuze operates a flash from the fuze travels through the hole into the open end of the detonator. The detonator goes off and scatters the filling providing a smoke screen. The Mk. II grenade was limited to training use only.

Grenade, Hand, Practice, No. 77 F.M., Mk. 1

In 1947 this was under development as a new training grenade. Designed as a training substitute to the WP version (No.

77 Mk. I), it was filled with FM to prevent the risk of fires. It was similar in design, size, shape, and handling to the Mk. I. This grenade was designed to replace the No. 77 Mk. II that suffered from many defects. It is not presently known if this grenade was adopted as a service store.

Grenade, Hand, Anti-tank, No. 78

Little is known about the No. 78 grenade; however, it was designed to be an anti-tank ambush weapon to be impact detonated. The theory was that the grenade would detonate on the tank with the HE filling breaking up the secondary C.A.P. filling into fine particles that would be driven into the air intakes of the tank and cause the crew to abandon the tank. While the grenade was designed and designated, it not put into production.

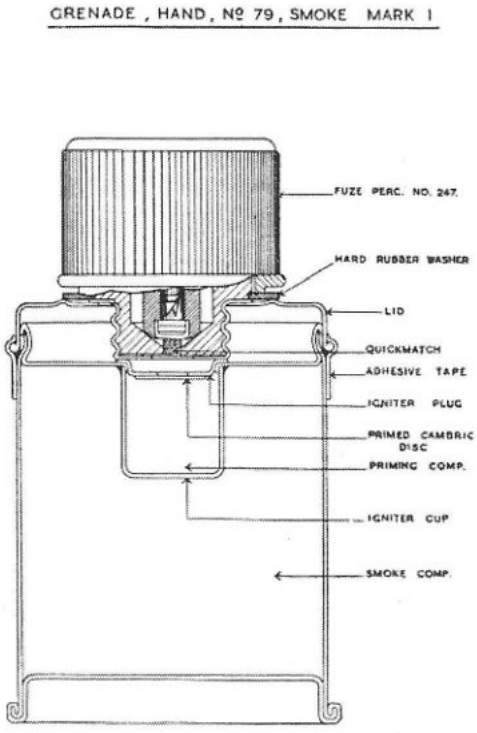
Grenade, Hand, No. 79, Smoke Mk. I

TYPE- Smoke-Screening
WEIGHT- 1 lb. 5.5 oz. to 1 lb. 10 oz.
LENGTH- 5.4 in.
DIAMETER- 2.8 in.
IGNITER- No. 247
FILLING- 14.5 oz. HCE
1 lb. 3 oz. CTC

Officially introduced for service in November of 1942 this grenade was for both Land and Naval use. It a smoke grenade of the emission type mainly used in training and for use by airborne forces.

No. 79 Mk. I
Photo - Norman Bonney

The body is cylindrical in shape made of tinplate. The bottom is closed by a tinplate disc recessed into the body and seamed on. A tinplate disc crimped in and carrying an igniter cup in the centre closes the top. The primer cup is filled with P.N. 227 and covered with a gunpowder primed cambric disc. A lid with socket for the fuze mechanism is spot soldered at four points and has the joint of body to cap covered by adhesive tape painted green to seal it. A No. 247 Mk. I or Mk. II fuze screws into the socket. The cap of the fuze is prevented from turning by an unpainted adhesive tape strip. To ensure ignition when fitted with the Mk. I fuze, the ignition system is modified by a 1 inch length of quickmatch being inserted in the flash hole of the fuze. The quickmatch is folded in four and fixed in position with a paper disc perforated in the centre and shellacked to the base of the fuze.



Early production grenades were filled with 14.5 ounces of P.N. 83 (M), (H.C.E.). The filling was later changed to 1 lb. 3 oz. of P.N. 398 (C.T.C.). The body is painted green and has the designation, filling station mark, date of filling, and lot number stenciled on the side of the body in black.

The grenade is issued ready for use. To use, the adhesive tape on the cap is removed and the cap unscrewed. The safety tape of the fuze is then held in position by the thumb of the throwing hand. When the grenade is thrown the tape unwinds and pulls out the safety bolt. The fuze will then operate on impact. When the fuze operates a flash is transmitted to the quickmatch in the Mk. I fuze and then to the cambric disc that then ignites the P.N. 227 in the igniter cup which then ignites the main filling. In the case of the Mk. II fuze, the flash is directed to the cambric disc that ignites the P.N. 227 and so the main filling. The ignition of the priming compound causes the cap to be blown off at the same time it ignites the filling. Smoke is emitted through the hole in the top of the grenade and continues for approximately 40 to 60 seconds.

Grenade, Hand, No. 79, Smoke Mk. II

This version is similar in construction to the Mk. I but uses a "Striker Mechanism No. 5 Mk. I" in place of the Fuze No. 247.

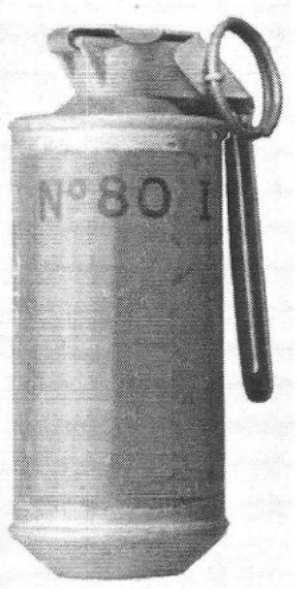
Grenade, Hand, No. 80 Smoke, WP

The No. 80 grenade is one of the longer serving grenades in service with British and Commonwealth Forces. First introduced for service in March 1943 it is still listed as a service grenade in Britain and Canada and possibly in other countries as well. The grenade has not changed much over the years but there have been some minor changes. Originally for hand use only, its use has been extended for discharger use as well. Consequently the designation has changed from "Grenade, Hand" to "Grenade, Hand/Discharger". The No. 80 grenade was adopted as standard in Canadian use in 1954. After VE day, a survey done of all Commanding Officers of the First Canadian Army noted that the No. 80 grenade was mainly used in the Anti personnel/Incendiary role, not for smoke.

Grenade, Hand, No. 80, Smoke Mk. 1

TYPE- Smoke- WP
WEIGHT- 1 lb.
LENGTH- 5.5 in.
DIAMETER- 2.4 in.
IGNITER- No. 2 Mk. 1
FUSE DELAY- 2.5 - 4 sec.
FILLING- 13 oz.

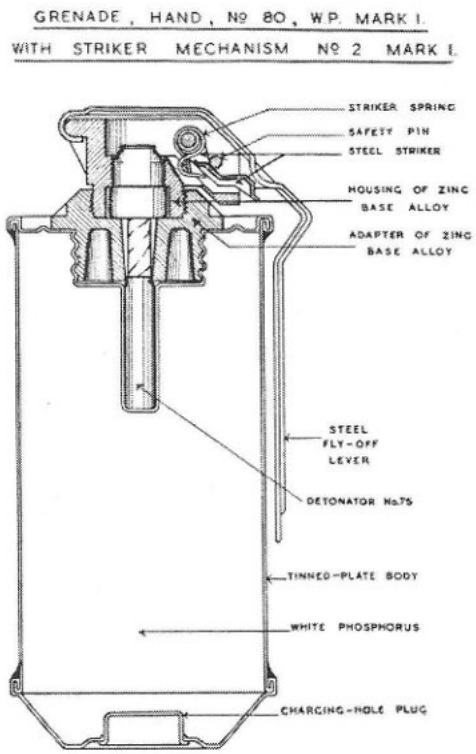
The entire body is constructed of tinplate in a cylindrical form. The top and bottom are attached by seamed and soldered joints. The top has a screw threaded recess to accept a "Striker Mechanism No. 2 Mk. I". A tinned brass detonator tube is soldered into the centre of the recess with the tube extending down into the centre of the grenade. The bottom is shaped like a truncated cone and has a recessed charging hole in the centre. After filling the hole is closed by a tinplate plug soldered into position.



No. 80 Mk. I
Photo - D. Gordon

There are two detonator assemblies used with the grenade. Detonators are issued separately from the grenades. The first, used in the early production grenades is the "Detonator, No. 75 Mk. 1". The second, used in later production grenades is the "Detonator No. 75 Mk. 2. The detonator used in the Mk. 2 has a more powerful effect than that used in the Mk. 1.

The original markings are the grenade body painted green with black markings. The designation, filling station mark, lot number, and date of filling are stenciled on the side of the body. In addition the abbreviation "PHOS" is stenciled in large black letters on the side of the body. Grenades filled before 1950 do not have a red filling ring and are painted mid green. After 1950 the bodies are painted sea green with a red filling ring. Black markings give the designation, manufacturers or filling station mark, lot number and date of filling. White letters "WP" indicate the filling. In addition there are other methods of indicating the filling that may be found with this grenade: "PHOS" in black letters 3/8 inch high, 1/2 inch white band, "WP" in black letters 3/8 inch high, and "WP" in white letters 3/4 inch high. The markings are now a light green body with a red band. Markings are in black with the designation "GREN HAND No. 80 Mk. 1", the lot number, and date of filling. In addition the marking "WP" in white is stenciled on both sides.



The grenade is issued unprimed. For use, the striker mechanism is unscrewed and a detonator assembly inserted in the detonator tube. The striker mechanism is then screwed back on. The grenade is then ready for use. When the pin is pulled and the grenade thrown the safety lever flies off releasing the striker. The striker rotates on its axis pin and hits the percussion cap in the detonator assembly. The percussion cap fires and ignites the safety fuze. The safety pin will burn for 2.5 to 4 seconds before firing the detonator. When the detonator fires it bursts the body of the grenade and scatters the filling. The white phosphorous filling ignites upon contact with the air causing an instantaneous smoke screen. Because of the properties of WP the grenade also has an anti personnel and an incendiary effect.

Grenade, Hand/Discharger, No. 80, Smoke Mk. 1/1

TYPE- Smoke- WP
WEIGHT- 1 lb.
LENGTH- 5.5 in.
DIAMETER- 2.4 in.
IGNITER- No. 2
FUSE DELAY- 2.5 – 4 sec.
FILLING- 13 oz.

The difference between the Mk .1 and Mk. 1/1 is slight; there is an annular recess in the base to facilitate assembly and to improve the sealing of the charging hole plug.

The No. 80 grenade could also be fired from the multi-barreled smoke discharger mounted on AFV's. This requires the use of a "Fuze, Electric, No. F103". The fuze has a brass gunpowder magazine containing G20 powder and is closed by a brass cover. The cover has a "Fuze, Electric, No. 53 Mk. 2 set into it. When set off, fires the gunpowder charge discharging the grenade from the discharger. After a short delay the grenade is detonated providing an almost instantaneous smoke screen.

Detonator, No. 75 Mk. 1
Consists of a zinc alloy cap, a length of No. 17 Mk. 3 safety fuze, a rimfire cap and a No. 63 Mk. 2 Detonator. The No. 63 Mk. 2 detonator consists of an aluminum cup containing an upper charge of 5.39 grains of ASA composition and a lower charge of 1.8/5 grains of Tetryl. Used only in early production grenades and can be recognized by a 1/2 inch brown ring around the white safety fuze and top of the detonator.

Detonator, No. 75 Mk. 2
Consists of a zinc alloy cap chamber, a 1.5 inch length of No. 20 Mk. 2 safety fuze, a rimfire cap and a No. 78 Mk. 1 Detonator. The No. 78 Mk. 1 detonator consists of an aluminum cup containing an upper charge of 5.4 grains of ASA composition and a lower charge of 3.9 grains of Tetryl. It is recognized by its all brown safety fuze. This detonator assembly provides a delay of 2.5 to 4 seconds.

Detonator, No. 75 Mk. 2/1
This is the Mk. 2 with a slightly different design to the cap chamber. In this version there is a groove formed around the body below the shoulder.

Drill Grenade, Hand/Discharger, No. 80 Mk. 1

This consists of the body of the service grenade filled with 13 ounces of an inert filling. The striker mechanism No. 2 Mk. 1, Mk. 1/1, or Mk.1/2 is fitted. A "Detonator, Drill, No. 75 Mk. 1" is provided for use with the drill grenades.

The body is painted white with black markings. Markings give the designation, the word "DRILL", the fillers mark, and month and year of filling. Due to a change in marking standards in 1966 grenades produced after this date are painted Oxford blue with white markings.

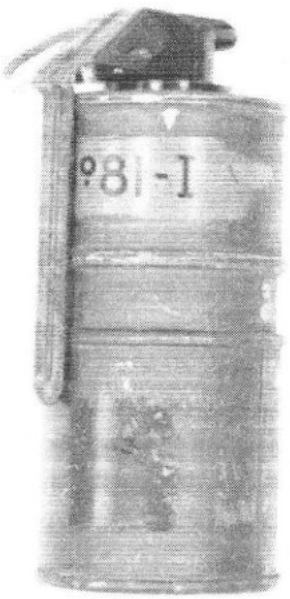
Detonator, Drill, No. 75 Mk. 1
Consists of a zinc alloy cap chamber, empty rimfire cap, dummy fuze and an empty No. 63 Mk. 2 Detonator. A hole is drilled through the detonator to ensure identification as a drill store. The entire detonator assembly is also painted white.

Grenade, Hand, No. 81, Smoke, Mk. I

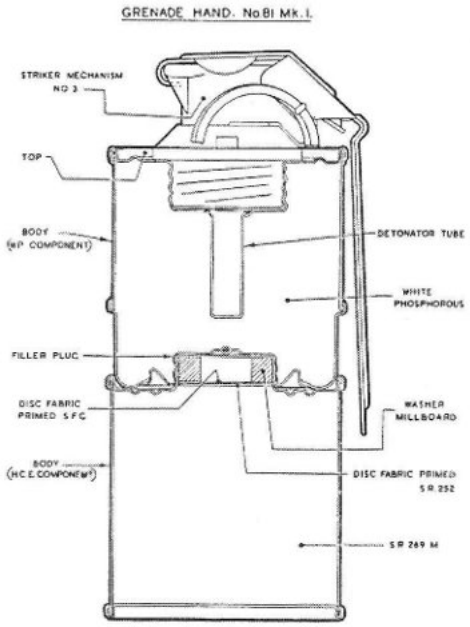
TYPE- Smoke- Screening
WEIGHT- 1.5 lb.
LENGTH- 5.25 in.
DIAMETER- 2.4 in.
IGNITER- No. 3 Mk. I
FILLING- 5.5 oz. WP and 8.5 oz. HCE

Officially introduced for service in August of 1944, this grenade was designed to supersede the No. 80 Mk. 1. It was for use by AFV crews to provide an instantaneous smoke screen followed by steady emission. It only remained in service for a few years, being declared obsolete in June 1948 in favor of the No. 80.

The grenade is made up of two parts, a bursting WP section and a smoke emission section. The sections are constructed of tin-plate or blackplate in a cylindrical shape. The upper component is the bursting WP section and is constructed in a similar manner to the No. 80 Mk. 1. The section is constructed in three parts, the cylindrical central



No. 81 Mk. I
Photo - Norman Bonney



portion that is seamed and soldered onto the other two portions. The top has a roll threaded well in the centre with a detonator tube soldered into the centre of the well. Finally the bottom section that has the filling plug soldered onto the base. The filler plug has a roll threaded well in the centre to allow attachment of the bottom section. This section is filled with 5.5 oz. of white phosphorous with a free space of 17 percent to allow for expansion. The striker mechanism, No. 3 Mk. I or Mk. I/I screws into the top threaded well. The "Detonator Assembly, No. 75 Mk. 2 is standard issue with this grenade, however the "Detonator Assembly, No. 75 Mk. 1" was issued during early production. The emission section is also constructed of three pieces, the cylindrical centre section and a flat base that is seamed onto the main centre section. The top is seamed onto the body and has a roll threaded projection on top to fit the bottom of the upper grenade component. This section is filled with 8.5 oz. S.R.269M, an HCE compound. The filling is then topped with a primed cambric disc. A thick millboard washer with a primed fabric disc shellacked to the base fits in the projection completing the component. It was found that when the grenade burst, the bottom of the WP component would remain attached to the bottom component slowing or preventing the ignition of the HCE composition. A modification was proposed to replace the millboard washers with a steel cutting washer that could cut a small hole in the bottom of the WP component eliminating the problem. It is not known if this was ever adopted or actually used.

Both sections of the grenade are painted green. The WP component is stenciled with the designation, the letters "PHOS" or a 1/2-inch white band, and filling details. The HCE section is also stenciled with the designation, the number of the smoke composition (SR269M) and filling details. The base of the grenade is stenciled with the manufacturers mark, date of assembly, and lot number.

For use the grenade must be primed by unscrewing the striker mechanism and inserting a "Detonator No. 75 Mk. 2". The striker mechanism is then screwed back into the housing. When thrown, the striker fires the cap in the detonator assembly igniting the safety fuze. After a delay of 2.5 to 4 seconds the detonator bursts the WP section providing an instantaneous smoke screen. The flash from the detonator also ignites the generator component that emits smoke for approximately 45 seconds. This system provides an instantaneous smoke screen that is maintained for a longer period by the generator section.

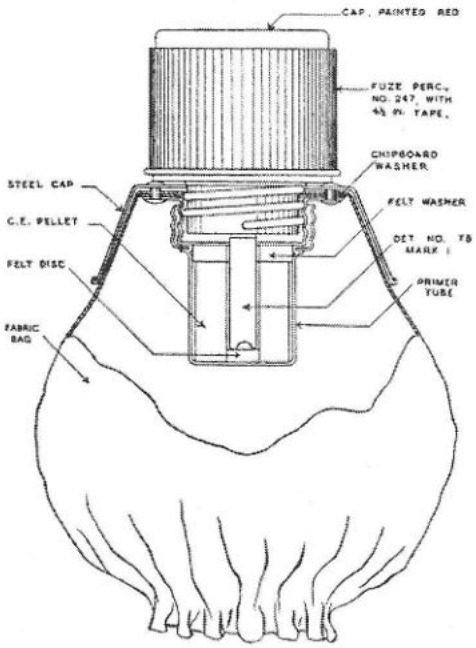
Grenade, Hand, No. 82 Mk. I (Gammon)

TYPE- Anti-Tank
WEIGHT- Varies
IGNITER- No. 247
FILLING- Varies with filling

The No. 82 Mk. I grenade was officially introduced for service in May of 1943. It is a departure from normal grenades being comprised of a fuze, detonator, primer, and a stockingette bag. Designed to be filled with plastic explosive or any other explosive that may be available, it was intended for close in use against AFV's.

The main body consists of a stockingette bag open at both ends. The lower end is gathered by elastic braid sewn into the bag. The upper end is fitted under a cup, the edge of the bag being clamped between the cup and a tinplate housing for the fuze. The housing and cup are held together by four equally spaced rivets. A primer tube is secured to a roll threaded cap which screws onto the underside of the fuze housing. The primer tube contains a C.E. primer with a central hole. A felt disc is placed

No. 82 Mk. I
Photo - Norman Bonney



at the bottom of the central hole and a felt washer on top of the primer.

A modified "Fuze No. 247 screws into the housing. The fuze has been modified for rapid arming by replacing the 11.5 inch tape with one of 4.5 inches. This allows for very rapid arming of the fuze after throwing. There was a shortage of 4.5 inch tapes at one point and the grenades were issued with tapes of the normal 11.5 inches. Boxes containing these grenades were specially marked with half inch yellow letters stating "11 1/2 inch tapes. The fuze cap is secured to the steel cup with a two inch piece of adhesive tape.

The steel cup is painted buff with black stenciling denoting the designation, manufacturers mark, and lot number. The top of the fuze cap is painted red denoting the short arming time.

The grenade must be prepared for use, by unscrewing the primer cup and inserting a "Detonator, No. 78 Mk. I" in the central hole of the primer with the open end up. The primer tube is then screwed back on and the stockingette bag filled with PE, or other explosives if PE is not available. The elastic bottom of the bag assists in holding the explosive in.

For use, grasp the grenade and remove the fuze cap, holding the tape weight with the thumb of the throwing hand. When the grenade is thrown the weight on the tape causes the tape to unwind and fall away from the grenade, pulling out the safety bolt as it does so. The fuze is then free to operate on impact.

Grenade, Hand, No. 82 Mk. I/I

This grenade is exactly the same as the Mk. I with the exception that the stockingette bag, elastic braid, and cotton thread is rot proofed.

Grenade, AT, No. 82 Mk. I Drill

TYPE- Drill
IGNITER- No. 247 Drill
FILLING- Sand/Sawdust

The drill version of the No. 82 is outwardly similar to the live version. The stockingette bag is replaced by a canvas bag, closed at the bottom and filled with a sand/sawdust mixture. A "Drill Fuze, No. 247" is used. Markings are a basically white overall colour with markings in black. The fuze mechanism is painted white.

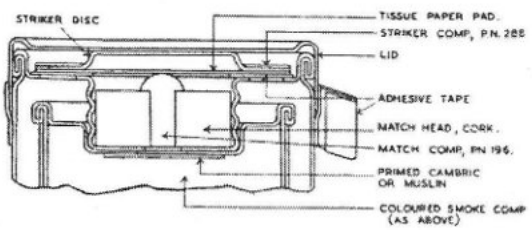
Grenade, Hand, Smoke, No. 83

The No. 83 coloured smoke grenade was first introduced for service in about 1944. It was designed for signaling replacing the No. 26 Smoke Generator. It has remained in service, in various Marks ever since and may remain in service today. It is being replaced by new smoke grenades that can be manufactured in a less expensive manner.

Grenade, Hand, Smoke, No. 83 Mk. 1

TYPE- Smoke- Signal
WEIGHT- 15.2 oz.
LENGTH- 5 in.
DIAMETER- 2.44 in.
IGNITER- Friction

This version was never introduced for service as it was intended as a temporary measure on account of production difficulties that were overcome prior to introduction. The main body was as for the production grenades (Mk. II) but the ignition system involved a match head igniter. The igniter was a cork disc with match composition P.N. 196 filled into a central hole in the disc. The match composition is built up on the top to make a



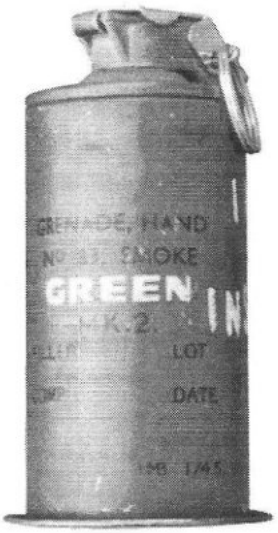
No. 83 Mk. I

good striking surface. The entire assembly is press fitted into the fuze well of the body and covered with a tissue paper pad. A strawboard striker in the form of a washer was placed on top of the tissue pad and the entire top of the grenade closed by a tinplate lid. The lid was sealed by a strip of adhesive tape covering the joint of body and lid. The body is painted green with black markings giving the designation and colour of smoke. The grenade was produced in blue, green, red, and yellow.

Grenade, Hand, Smoke, No. 83 Mk. II

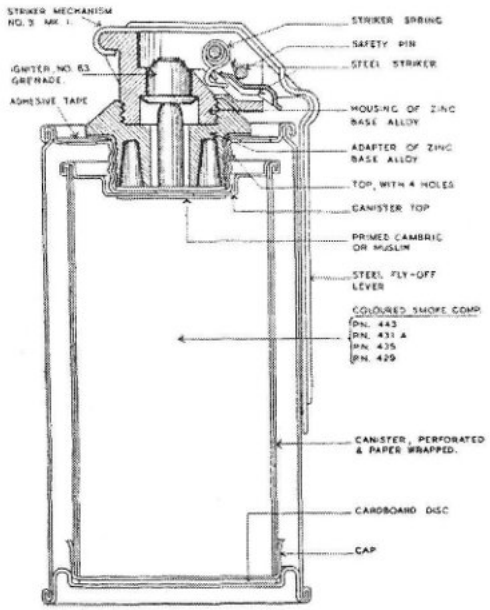
TYPE- Smoke- Signal
WEIGHT- 16 oz
LENGTH- 5.5 in.
DIAMETER- 2.44 in.
IGNITER- No. 3 Mk. 1 or No. 4 Mk. 1
FILLING- 6 – 7.5 oz. Depending on colour

This is the first production version of the No. 83 grenade; it was introduced for service in February 1944. The body is made up of several parts. The outer container is cylindrical with a top cap rolled and seamed on. The top cap has a roll threaded recess to fit the striker mechanism and four emission holes evenly spaced around the recess. The emission holes are sealed by shellacked adhesive tape. The bottom is also rolled and seamed onto the main body. Normally both top and bottom are recessed but it is also possible to find them with a flanged bottom secured by a folded seam.



No. 83 Mk. II
Photo - D. Gordon

Contained within the body is a sheet steel canister that is perforated by 0.15-inch holes with the holes on 0.2-inch centres. This canister contains the smoke composition held in place by a paper wrapper. The top is recessed to fit over the striker mechanism recess and the bottom is closed by a press fit sheet steel cap. Cardboard discs in the bottom of the grenade ensure the canister is held firmly within the body. The space between the canister and body is empty. A primed cambric disc shellacked in the top of the canister ensures the ignition of the smoke composition. The smoke composition may be of four types, PN469A for red smoke, PN473A for yellow smoke, PN468A for green smoke, or PN471A for blue smoke. Alternative fillings of PN 490A or PN491A for green smoke and PN510 or PN603 for blue smoke were later approved for use. The filling of PN473A was used prior to 8 December 1952 and necessitated an asbestos lining for the body of the grenade. This grenade emits smoke for 20 to 40 seconds.



A striker mechanism No. 3 Mk. 1 screws into an adapter cemented into position in the recess in the top cap of the grenade. An "Igniter, No. 83 grenade" is cemented into the striker mechanism. The igniter consists of a cap holder with a rimfire cap crimped onto a length of "Fuze, Instantaneous burning, Mk. IV". The "Striker mechanism No. 4 Mk. I was later approved for use with this grenade.

The body is painted green and has black markings giving the designation, manufacturers mark, filling station and date, date of empty body manufacture, manufacturer, lot number, and composition number. Markings in white give the colour of smoke. These early grenades do not have a red filling ring.

Grenade, Hand, Smoke, No. 83 Mk. 2/1

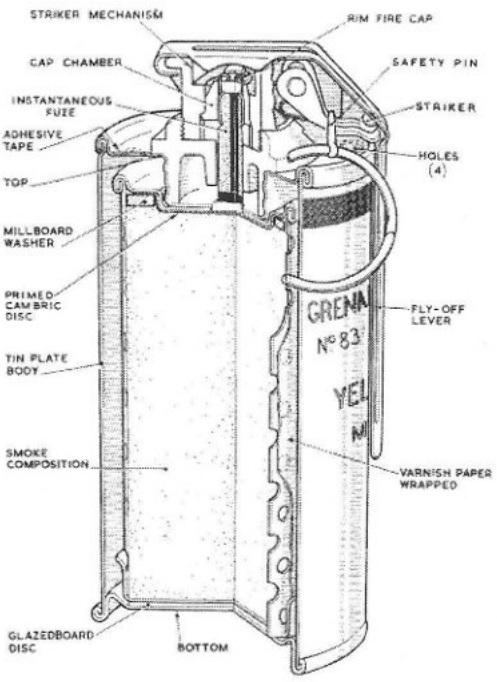
TYPE- Smoke- Signal
WEIGHT- 1 lb.
LENGTH- 5.5 in.
DIAMETER- 2.56 in.
IGNITER- No. 3 Mk. 1/3 or No. 4 Mk. 1

This version was introduced in November 1953. The body consists of a tinplate cylindrical body formed with a folded seam flush with the outside and soldered together. The top is slightly dished and has a central recess roll threaded to accept an adapter. Four ¼" emission holes are evenly spaced around top and sealed with small tape squares. The bottom is doubly dished. Both the top and bottom are seamed to the body with a

folded joint. The bottom is not fitted until the grenade has been filled. This grenade uses striker mechanism No. 3 Mk. 1/3 or No. 4 Mk. 1 and "Igniter Grenade No. 2 Mk. 1/1".

The smoke canister is a sheet steel cylinder formed with a folded seam and spot welded. The top is closed by a tinplate top that is dished and recessed to fit the recess in the top plate of the grenade body. The cylinder is perforated all over and covered with paper and shellacked. After filling the bottom is closed by a press fit tinplate cap. The filling is pressed into the canister in three equal increments. It is primed by a primed cambric disc attached to the underside of the canister top by a millboard washer. The canister is held tight in the body by glazed-board discs used as filling at the bottom of the grenade. It differs from the Mk. 2 by using new smoke compositions with improved storage qualities and the internal smoke canister has less holes

The grenade is painted green with markings in black. Markings give the designation, manufacturers mark, filling station and date, date of empty body manufacture, manufacturer, lot number, and composition number. The fillings can be PN758 for Blue smoke, PN759 for Green smoke, PN757 for Red smoke, or PN760 for yellow smoke.



No. 83 Mk. 2/1

Grenade, Hand, Smoke, No. 83 Mk. 3

Introduced in April 1953 as an experimental model. This version did not make it into British production, but was not declared obsolete until March 1962. It does however appear that the Australians produced a No. 83 Mk.3 at St. Mary's.

Grenade, Hand, Smoke, No. 83 Mk. 3/1

TYPE- Smoke- Signal
WEIGHT- 1 lb.
HEIGHT- 5.5 in.
DIAMETER- 2.56 in.
IGNITER- No. 3 Mk. 1/2

Introduced in September of 1961. The body is tinplate, cylindrical in shape with top and bottom closing plates. The top closing plate is centrally perforated to accept an adapter. The adapter is made of zinc alloy in two parts that form a holder for the striker mechanism when fitted together. The plug portion is fitted on the bottom of the top plate through the hole and screws into the top portion of the adapter. The grenade uses "Striker Mechanism No. 3 Mk. 1/2", and "Igniter Grenade No. 2 Mk. 1". The bottom is closed by a combination of three things, a tinplate base, copper diaphragm and tinplate closing disc. The base is centrally perforated and formed with a short projection facing into the body that forms a seat for the ignition tube. The copper diaphragm is fitted and finally the tinplate disc is rolled and seamed onto the body cylinder.

No. 83 Mk. 3
Australian manufacture
Photo - B. Perkins

The grenade is filled before the top is fitted with a single pressed pellet of smoke composition. An ignition tube perforated through its length by 3/16" holes fits through a hole in the centre of the pellet. The ignition tube is held at the base by the projection on the base. A primed cambric sleeve is fitted over the sleeve before the smoke pellet is inserted in the body. Glazeboard discs are placed on top of the filling to hold it tightly within the body. The fillings can be PN758 for Blue smoke, PN759 for Green smoke, PN757 for Red smoke, or PN760 for yellow smoke. The filling is in the form of a pressed pellet.

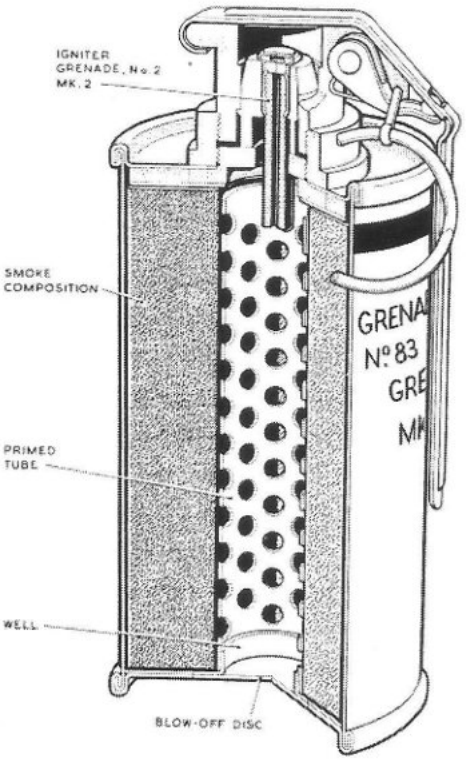
When the grenade is ignited the igniter causes the primed cambric to ignite in turn igniting the smoke composition. The gases formed by the burning smoke composition blow the copper diaphragm off the bottom of the grenade allowing the smoke to escape through a single emission hole in the base. Full smoke emission is for between 15 and 25 seconds.

Grenade, Hand, Smoke, No. 83 Mk. 3/2

TYPE- Smoke- Signal
WEIGHT- 1 lb.
HEIGHT- 5.5 in.
DIAMETER- 2.56 in.
IGNITER- No. 3 Mk. 1/2

Introduced in June of 1964. The grenade uses "Striker Mechanism, No. 3 Mk. 1/2" and "Igniter, Grenade, No. 2 Mk. 2". The four emission holes in the top of the body are covered with muslin and painted.

The body is painted Sea Green. Markings in black give the designation, colour of smoke, Lot number, date of manufacture, and filling marks. This version produces smoke for 25-45 seconds. This grenade was produced in Red, Green, Blue, and Yellow. The fillings can be PN758 for Blue smoke, PN759 for Green smoke, PN757 for Red smoke, or PN760 for yellow smoke.



No. 83 Mk. 3/2

Grenade, Hand, Smoke, No. 83 Mk. 3/3

TYPE- Smoke- Signal
HEIGHT- 115mm
DIAMETER- 60mm
IGNITER- No.3 Mk. 1/2

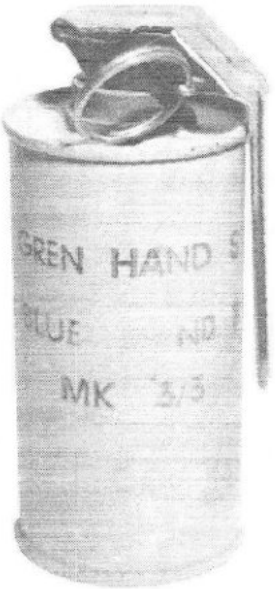
Introduced in April of 1969. The filling is pre-pelleted before insertion into the grenade body. It uses "Igniter No. 1 Mk. 2". The bottom of the grenade has an aluminum disc fitted to reduce the well depth inside the grenade body.

Body is painted light green with markings in black. Markings give the designation, manufacturers mark, date of manufacture, and lot number. Three "C's" are painted on the lower portion of the body in the colour of smoke produced.

Grenade, Hand, Smoke, No. 83 Mk. 3/4

This grenade consists of a tinplate body with an adapter permanently mounted in the top cap. A striker mechanism screws into the adapter. The bottom of the grenade has one large emission hole that is sealed by a thin casing.

The body contains a smoke composition that may produce smoke in any four colours for a period of 15 to 25 seconds. Colours may be green, red, yellow, or blue. The main body of the grenade is painted light green. Markings in black give the designation, manufacturers mark, lot number, and date of filling. In addition three "C's" are painted on the lower body in the colour of smoke produced.



No. 83 Mk. 3/3
Photo - B. Perkins

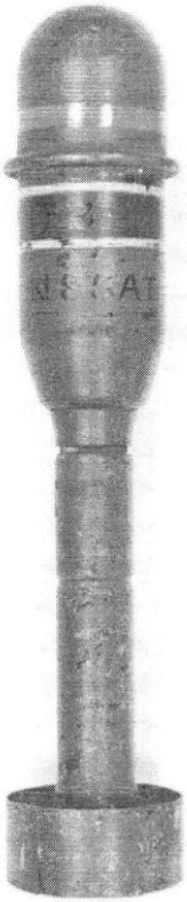
Grenade, Hand, No. 84 Mk. I [L]

This was a spherical cardboard grenade used in training. It was commercially obtainable from Messrs Pains Ltd. as early as 1917. It is thought that the designation was issued to cover possible procurement although it was never introduced into service with this designation. There was a similar design in service with the RAF as Puff Powder.

It is also noted in a Canadian document, written in London and dated in 1945, that the No. 84 was a Magnetic A.T. Hollow charge grenade under development. It is possible that the designation was not used for the training grenade and was reissued to cover the development of the magnetic AT grenade. At this point in time it is not possible to confirm this information.

Grenade, Rifle, No. 85, Anti tank

This grenade was produced due to an urgent requirement for an effective anti-tank weapon that was lighter than the



No. 85 Mk. I
Photo - Norman Bonney

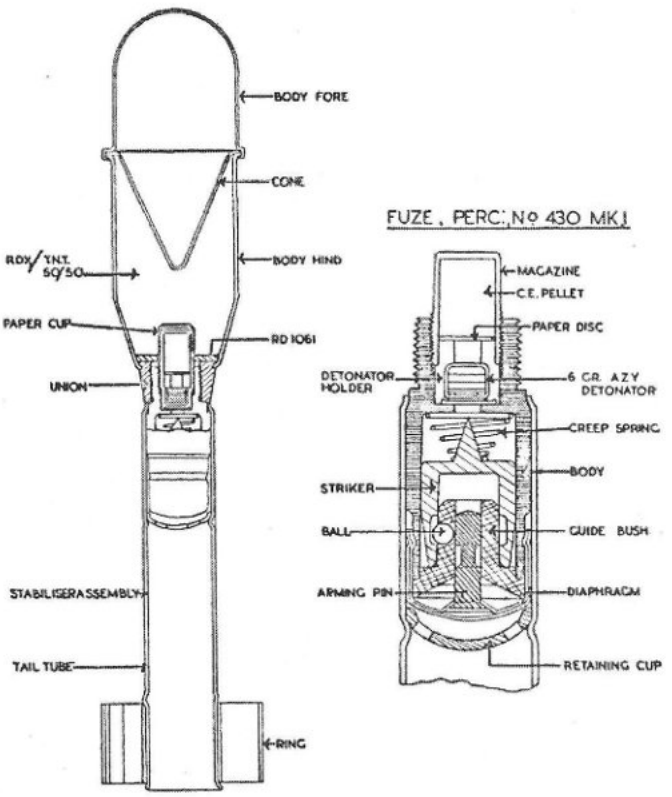
P.I.A.T. (Projector, Infantry, Anti Tank) for use in the Far Eastern Theatre. The Americans had already been using an effective spigot launched anti tank grenade, the M9A1 so the No. 85 grenade was designed from it. The British designers did not like some features of the fuze in the M9A1, mainly the striker being held off the detonator assembly by a creep spring and safety pin. It was found that once the safety pin was removed a relatively small drop on its nose could detonate the grenade. The British grenade was designed to take the "Fuze, No. 430" a reversible diaphragm fuze that was armed by gas pressure on firing. The fuze was faster than the American fuze and therefore the ballistic cap of the grenade was shortened. The reasoning behind this was a faster fuze meant there was less crushing of the cap on impact and therefore a shorter nose would still provide the proper standoff for the shaped charge to form properly. The Mk. 1 was introduced for service in April 1945 and declared obsolete in September 1946.

Grenade, Rifle, No. 85 Mk. 1, Anti-tank

TYPE- Anti-tank
WEIGHT- 1 lb. 4.25 oz.
LENGTH- 10.5 in.
DIAMETER- 2 in.
IGNITER- Fuze 430 Mk. 1 or Mk. 2
FILLING- 4.25 oz.

The head of the grenade is made of steel in three parts. The base is coned toward the bottom and has a flange on the top. The inner cone has a 44 degrees apex angle with a flange on the top. The ballistic cap is rounded with a larger flange at the bottom end. The cone fits inside the base with the flange resting on top of the base flange. The ballistic cap fits over that with the flange being spun over those of the cone and base to hold the body together. The base is open at the bottom to fit into a steel union with the edges of the body spun into a groove in the union. The union is internally threaded to take the fuze. The tail assembly consists of the fuze, tail tube, and fins. The tube and fins are made of steel. The "Fuze, No. 430 Mk.1" or "Mk. 2" is fixed into the top of the tail tube by indenting the tube into cannelures in the fuze body and by a cannelure below the steel retaining cup. The fins are fixed to the bottom of the tube by a cannelure in the tube to act as a stop at the top of the fins and by belling out the base of the tube. The fin assembly consists of three fins and a circular drum.

The "Fuze No. 430 Mk. 1 has a steel body with a brass detonator holder in the forward end. A 6-grain AZY detonator is contained within the detonator holder. A brass magazine containing a CE pellet screws over the detonator holder. The base of the body contains the guide bush, with a diagonal hole containing a steel ball and a central hole to accommodate the arming pin. The guide bush is retained by the double diaphragm that is rolled into a cannelure in the fuze body. The arming pin is riveted to the inner diaphragm. The steel striker in the form of an inverted cup has a groove cut in its internal surface so that the ball, held outwards by the arming pin, prevents the striker from moving forward. A creep spring is positioned between the striker and perforated diaphragm of the body.



The "Fuze, No. 430 Mk. 2" differs from the Mk. 1 in having no perforated diaphragm between the creep spring and detonator holder. In this Mark the detonator holder is screwed into the body to retain the spring. A double cannelure on the body ensures a stronger joint between tail tube and fuze. In addition the body may be of brass or steel.

The rear portion of the body is filled with 4.5 ounces of

RDX/TNT 50/50. A cavity in the base is lined with a waxed paper cup to fit the magazine of the fuze.

The grenade is painted buff with a blue band edged with yellow denoting the filling. Just below the body junction "TNT 3" is stenciled in black. The designation is stenciled in black on the base of the head while filling details are stenciled on the ogive. A red band denoting unrestricted issue in all climates is painted on the ogive as well.

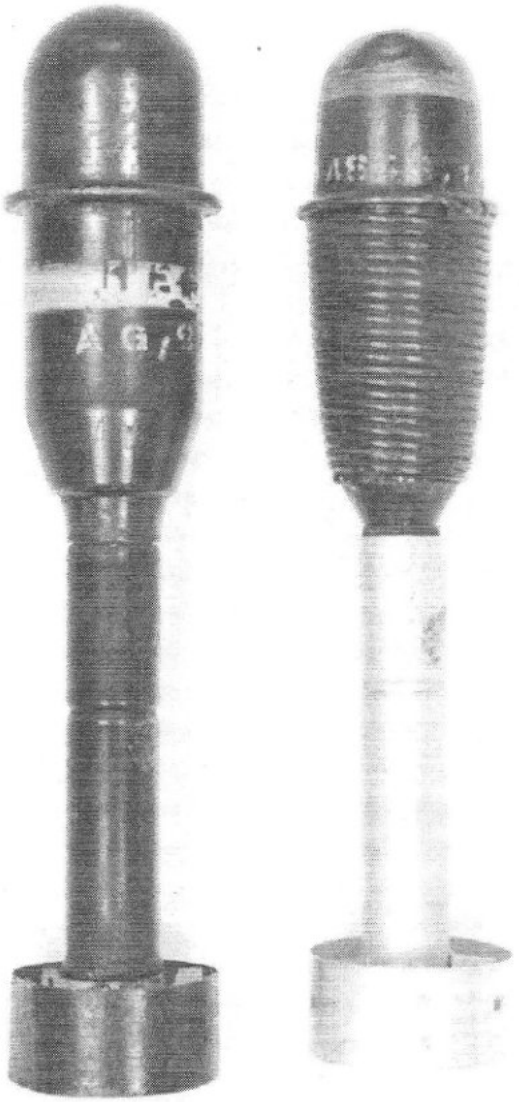
When the grenade is fired from the rifle the pressure of the propellant gases reverses the double diaphragm forcing the arming pin forward. The retaining ball creeps forward into a groove in the arming pin releasing the striker. The striker is then held only by the creep spring. On impact the striker is driven forward into the detonator, which causes the grenade to fire.

Grenade, Rifle, No. 85 Mk. 2, Anti-tank

TYPE- Anti-tank
WEIGHT- 1 lb. 4.25 oz.
LENGTH- 10.5 in.
DIAMETER- 2 in.
IGNITER- Fuze 431 Mk. 1
FILLING- 4.25 oz.

This grenade differs from the Mk. 1 only in that it uses "Fuze, No. 431 Mk. 1". The fuze is similar to the No. 430 but the magazine holding the CE pellet is larger. The magazine and detonator holder are in one piece and the C.E. pellets are retained are retained by a thin brass cup rolled into a cannelure in the body of the fuze.

It is unlikely that this grenade made it into actual service since it was introduced for service in January 1947 and declared obsolete the same month.



No. 85 Mk. 2
Photo - Norman Bonney

No. 85 Mk. 3
Photo - Norman Bonney

Grenade, Rifle, No. 85 Mk. 3, Anti Tank

TYPE- Anti-tank
LENGTH- 10.5 in.
DIAMETER- 2 in.
IGNITER- Fuze 431 Mk. 1/1
FILLING- 4.25 oz.

This was never actually introduced for service as it was decided not to continue with rifle grenades. It was however, a development item that attempted to give a dual-purpose grenade by improving the fragmentation effects of the No. 85 grenade. To accomplish this the lower body was wire wrapped to provide the fragmentation. It was to have used the "Fuze, No. 431 Mk. 1/1 in a light alloy tail unit.

Grenade, Rifle, No. 85 Mk. 1, Practice

This was a grenade, used for firing practice that was manufactured in a similar manner to the live grenade but its components were strengthened and easily replaceable if damaged. This combination allowed the grenade to be fired many times.

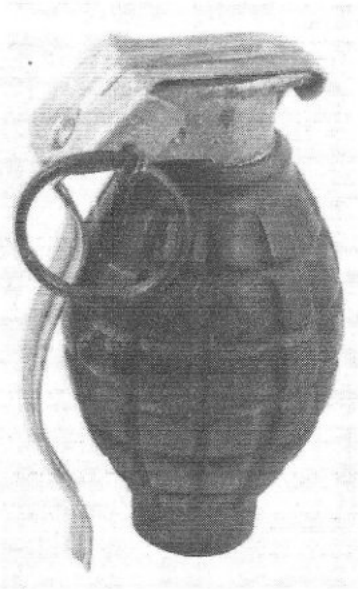
Grenade, Rifle, No. 85 Mk. 1, Drill

This is an instructional grenade; it is not designed to be fired as a practice grenade. The grenade is manufactured in the same manner as a live grenade but has no live components. The grenade is painted white with markings in black. It also appears that there was a sectioned version used for teaching the operation of the grenade, it was also painted white with different colours edging the cutaway portions to more easily see the workings.

Grenade, Rifle, No. 86 Mk. 1

TYPE- Fragmentation WEIGHT- 1.5 lb. LENGTH- 10.5 in. WIDTH- 1.75 in.

This grenade was developed in the period 1944-1945 with the basic idea to have a combination hand and rifle grenade. There were at least two designs of the grenade, one using a pyrotechnic delay to initiate the grenade, the other using an igniter mechanism similar to the No. 2. The trials grenade used the "Striker Mechanism No. 2" with a modified striker lever. The development was dropped when the No. 85 Mk. III began to show promise. The "Requirements for Infantry Weapons" in 1947 eliminated the need for rifle grenades in British Service. The requirement was brought back in 1949 with the advent of the EM2 rifle trials.

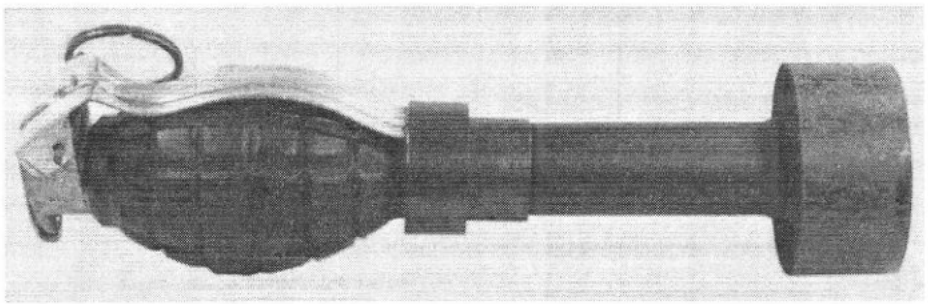


No. 86 Mk. I
Photo - Norman Bonney

The body was of cast iron in an egg shape with external segmentation. The top was threaded to receive the striker mechanism and a projection on the bottom was internally threaded to receive the tail assembly. The striker assembly appears to be the No. 2 but may have been slightly modified for use with this grenade. The striker lever has been modified; it is longer and bent to conform basically to the shape of the body.

The tail assembly is constructed of sheet metal. It has a tail tube with an internal diameter of 22mm to fit the spigot launchers for the No. 4 and No. 5 rifles. Attached to the bottom of the tube is the fin assembly. It has a solid ring around the fins to support and protect them in transit. The top of the tube has an adapter, threaded to match the threads in the body of the grenade. Also at the top of the tube is a sheet metal setback collar that when in position holds the striker lever down after the safety pin is removed.

For use, the grenade would be screwed onto the tail assembly ensuring that the setback collar engaged the striker lever properly. Then the grenade could be mounted on the launcher. The safety pin would be removed just prior to firing. When the grenade is fired, the setback caused by the firing would cause the setback collar to move to the rear and release the lever. The striker mechanism then initiated a delay that burned down to the detonator and fired the grenade. For use as a hand grenade, remove the tail assembly, pull the pin, and throw as normal.



No. 86 Mk. I fitted with tail assembly
Photo - Norman Bonney

Grenade, Rifle, W.P. No 87

This grenade is similar to the No. 80 WP grenade but is mounted on a tail assembly for launching from a rifle. It was introduced in June 1947 as a development item but development was stopped later in 1947 when rifle grenades were abandoned. It was officially declared obsolete in July of 1949.

Grenade, Rifle, No. 87, Smoke, W.P., Mk. 1

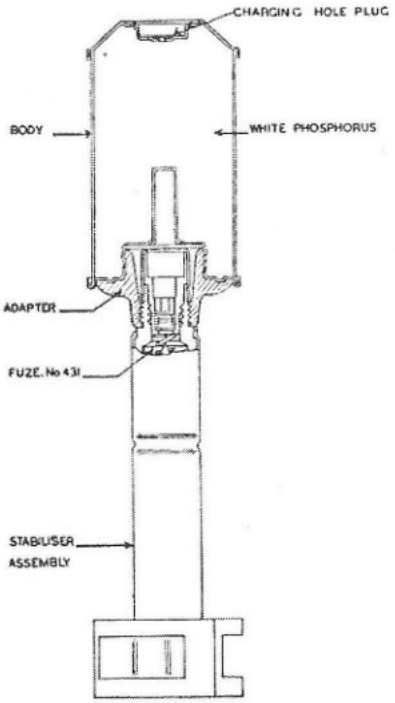
The body is similar to that of the No. 80 grenade. It retains the detonator sleeve but is shorter than the No. 80. The filling hole is located in the nose of the grenade and is sealed with a tinplate charging hole plug soldered into position. A roll threaded recess in base has an aluminum alloy adapter screwed and cemented in place. The adapter is internally threaded to accept the "Fuze, Base, Percussion, No. 431". The fuze is secured to the steel tail tube by rolling the tube into cannelures on the body of the fuze. The steel tail fin assembly is formed by a circular drum with six fins formed into it by slotting the drum. The fin assembly is attached to the tail tube by welding.

No. 87 Mk. I
Photo - Ken Francis

The body is filled with 9.5 ounces of white phosphorous with the normal 10% free space. The free space is to allow for expansion of the filling in hot storage conditions.

The body of the grenade is painted green with a red filling ring. The WP filling is denoted by the letters "PHOS" in white or a .5 inch white band around the body. The designation and filling details are stenciled in black.

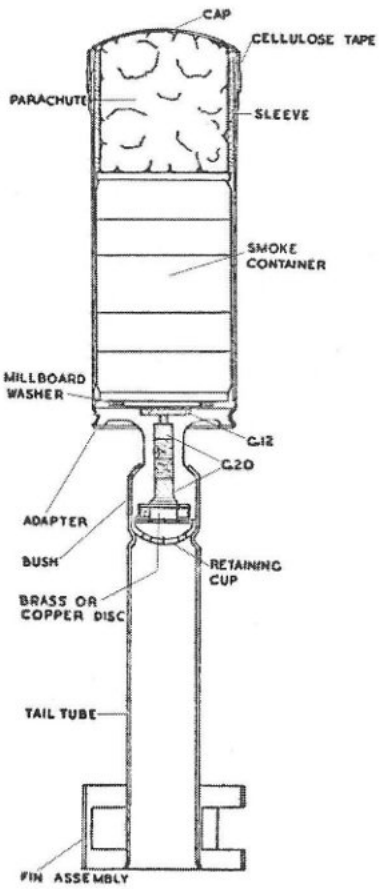
When the grenade is fired the pressure of the propellant gases reverses the double diaphragm forcing the arming pin forward. The retaining ball creeps forward into a groove in the arming pin releasing the striker. The striker is then held only by the creep spring. On impact the striker is driven forward into the detonator, which causes the grenade to fire bursting the body and scattering the filling. The white phosphorous ignites on contact with the air forming an almost instantaneous smoke screen. Because of the nature of white phosphorous these grenades also have a considerable anti personnel effect.



Grenade, Rifle No. 88, Smoke, Mk. 1

TYPE-	Smoke, Signal
WEIGHT-	1.25 lb.
LENGTH-	11 in.
DIAMETER-	2 in.

This grenade was introduced for service in May of 1946 but the design was cancelled due to failure of the grenade in climatic trials.



The body is either seamless or a welded seam steel cylinder secured onto the base adapter by rolling into a cannelure on the adapter, turning over the base and stabbing in three positions. A band is spun out at the upper end to provide rigidity. The body is rust proofed all over. A domed steel cap closes the upper end and is sealed with cement and a cellulose tape of the same colour as the smoke produced. A tinned plate cylinder containing the coloured smoke composition is contained within the body and rests on a millboard washer. The container is closed on the top end by a tinplate cap. The centre of the cap has a split pin passing through it to attach a wire ring. A copper wire runs from the ring to the parachute that was contained in the top portion of the grenade. Four emission holes in the side of the container are covered by Lassolastic tape in the same colour as smoke produced. Two coloured smoke pellets are contained within the container separated by a disc of primed cambric. A length of 6-thread quickmatch is placed in the central hole. The bottom end is covered by primed cambric discs and finally closed by a perforated tin cap. The grenade was produced in four colours, red, blue, green, and yellow. The fillings are PN507 for red, PN493 for blue, PN500 for yellow, or PN509 for green.

The grenade is painted green with a red filling ring. Markings are in black except for the colour of the signal which is marked in white.

Grenade, Rifle, Illumination, No. 89 Mk. 1

This was part of the series of rifle grenades designed near the end of the Second World War or just after. This particular

one was a speculative project that ended in 1947 when the "Requirements for Infantry Weapons" eliminated rifle grenades.

Its design was similar to the No. 88 using the same tail unit and likely the same fuze mechanism. The flare container was a cylinder secured onto the base adapter by rolling into a cannelure on the adapter and turning over the base. The top is closed by a cap that fits over the cylinder. Initially the flare portion from the Mk. 1 Trip Flare was built into a can and fixed onto the tail unit. Experiments were done with different flares of varying candle power. The final grenade had a flare rated at 80000 candlepower that would burn for 20 seconds. The grenade would open at a height of about 70 feet. Near the end of the project designs incorporating a parachute for suspending the flare were produced.

The grenades were painted dark green with a red filling ring around the base of the flare container. The designation, date of manufacture and lot number are stenciled in white onto the flare container.

No. 89 Mk. 1
Photo - Ken Francis

Grenade, Hand, Practice, No. 90

This was an Indian manufactured practice grenade used to simulate the No. 36M Mk. I grenade. Service was with the Indian Army only.

Grenade, Hand, Practice, No. 90 Mk. 1

The grenade was constructed of paper, bamboo, and wire. The charge is contained within a paper envelope supported by four bamboo sticks and bound together by string. The igniter, made up of a two inch piece of safety fuze inserted crimped to a copper igniter. The other end of the fuze is then inserted into the charge. The body is then bound by wire, the copper igniter protected by a wooden cap and the body then dipped into a waterproofing compound. The charge is 4.5 oz of a compound consisting of 66% potassium perchlorate and 34% aluminum powder.

Grenade, Hand, Practice, No. 90 Mk. 2

This version was constructed in the same manner as the Mk. 1 but the igniter is replaced by an empty tube. The grenade must be primed with a length of safety fuze when required for use.

Grenade, Hand, Practice, No. 90 Mk. 3

This version was smaller than the Mk. 1 and 2. The filling was 1.6 oz of a Cracker mixture composed of 2 parts potassium perchlorate and 1 part aluminum powder.

Grenade, Hand, Anti Riot, No. 91

This lachrymatory grenade was adopted for service in February 1948 as the No. 91 Mk. 1. The Mk. 1 was adopted as an emergency experimental type until superceded by the No. 92. It was officially declared obsolete in April of 1958, well after use had ceased.

Grenade, Hand, Anti Riot, No. 91 Mk. 1

TYPE- Gas
WEIGHT- 1 lb. 4 oz.
LENGTH- 4.45 in.
DIAMETER- 2.55 in.
IGNITER- No. 3 Mk. 1/1
FILLING- 185 grams

The No. 91 Mk. 1 is constructed in a similar manner to the No. 83 Mk. 2. The body is made up of several parts. The outer container is cylindrical with a top cap rolled and seamed on. The top cap has a roll threaded recess to fit the striker mechanism. The bottom is also rolled and seamed onto the main body. Emission holes are evenly spaced around the side of the body and covered with tape. The inner container is a sheet steel canister perforated by 0.15-inch holes with the holes on 0.2-inch centres. This canister contains the lachrymatory compound held in place by a paper wrapper. The top is recessed to fit over the striker mechanism recess and the bottom closed by a press fit sheet steel cap. Cardboard discs in the bottom of the grenade ensure the canister is held firmly within the body. The igniter mechanism

is the "Striker Mechanism No. 3 Mk. 1/1". The detonator is the "Detonator, No. 102 Mk. I" with a delay of about 1 second.

The body contains a filling of 185 grams of PN501 (B2), a lachrymatory compound. The filling is pressed into the inner container with 4 pressings and finally topped with 5 grams of priming compound, SR252.

The body is painted grey with a .75 inch black band on top. The filling composition code "B2" is painted on the black band in white, all other markings are stenciled in black. Markings include the designation, a part number "T.W. 6 GF", the manufacturers mark, filling station mark, date of filling, and lot number. These markings are all stenciled on the side of the body.

This grenade even though issued to some troops, was never an officially approved store. Its action was so mild and it emitted gas so slowly the target personnel had time to pick the grenade up and throw it back.

Grenade, Hand, Anti Riot, No. 91 Mk. 2

TYPE- Gas
WEIGHT- 1 lb. 4 oz.
LENGTH- 4.45 in.
DIAMETER- 2.55 in.
IGNITER- No. 3 Mk. 1/3 or No. 4 Mk. 1
FILLING- 185 g

This version was adopted for use in August 1955 and corrected most of the deficiencies of the Mk. 1 version. It has a more rapid action but is not totally satisfactory in that respect.

No. 91 Mk. 2

The body is a tinned plate cylinder formed with a folded seam, flush on the outside. The top is also tinned plate, is slightly dished with a central recess roll threaded to accept the striker mechanism. A hole in the centre of the recess allows the passage of the flame from the igniter. Four .25 inch emission holes are evenly spaced around the central recess and closed with shellacked adhesive tape. The top is seamed to the body with a folded joint containing a sealing compound. The bottom is dished from both sides and is attached to the body in the same manner as the top. An inner canister made of steel is perforated by .15 inch holes on .2 inch centres all over its surface. It is formed with a lap seam, flush on the outside and spot welded. The exterior of the canister is covered by shellacked paper. The top of the canister is of tinned plate and is dished and recessed to fit over the recess in the top plate of the grenade. The bottom is closed by a tinned plate cap that slides onto the canister. When the grenade is assembled, the reverse dishing on the bottom plate holds the inner canister firmly in position. Cardboard discs are used at the bottom to firm up the packing.

A "Striker Mechanism No. 3 Mk. 1/3" is screwed into an adapter mounted in the top of the grenade. An "Igniter, Grenade, No. 1 Mk. 1 is used in conjunction with the striker mechanism.

The grenade is filled with 185 grams of composition PN501 in four increments pressed at 2 tons. A topping of 5 grams of SR252 igniting composition and a primed cambric disc completes the filling. A second primed cambric disc covers the bottom of the recess in the top of the grenade body. This grenade will emit gas for approximately 25 seconds.

The body is painted grey and has a red filling ring around the top of the body. As well, there is a wider red band around the middle of the body. Above the middle band, the letters "CN" are stenciled denoting the type of filling. Other stenciled markings on the side of the body include the designation, Lot number, date of filling, manufacturers mark, and date of manufacture.

Grenade, Hand, Instructional, No. 91

It is noted in training manuals that these are available but give no details. The instructional grenades will be made in the same manner as live grenades but have no live fillings. Markings are unknown at this time.

Grenade, Hand or Rifle, Lachrymatory, No. 92 Mk. 1

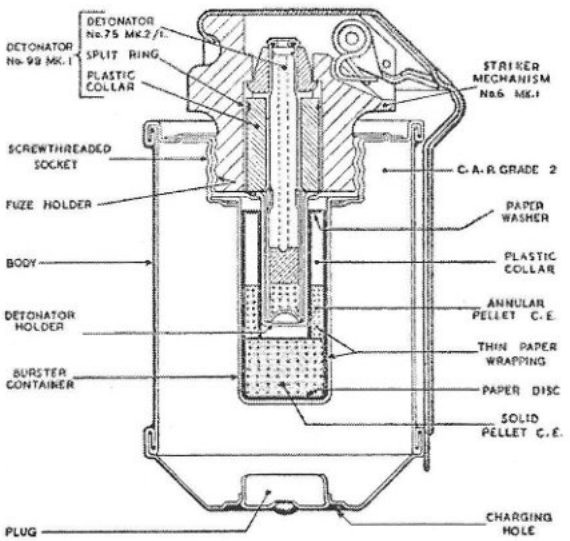
This grenade was initially designed for use by hand or fired from a rifle. It was introduced for service in December 1945.

In July 1948 its use as a rifle grenade was discontinued and its nomenclature changed to "Grenade, Hand, Lachrymatory, No. 92 Mk. 1". The grenade was declared obsolete in May 1957.

No. 92 Mk. I

The body is a tinplate cylinder with a truncated base. A charging hole is located in the centre of the base and is closed by a cup shaped plug soldered into place. The top plate has a socket formed into the centre that is roll threaded to accept a "Striker Mechanism, No. 6 Mk. 1" and a "Detonator, No. 99". The detonator is similar to the one used in the No, 80 grenade but has a plastic collar fitted around the fuze and secured to the cap chamber by a split collar. A cylindrical burster container is soldered to the bottom of the socket and intrudes into the body. The burster container contains the bursting charge of two CE pellets. The body contains a filling of PN501 (B2), a lachrymatory compound.

For rifle use the striker mechanism was removed and replaced by a "Tail Unit, No. 2 Mk. 1" and an adapter containing a "Fuze, No. 430 Mk. 2". This increases the weight of the grenade to 17.5 oz.. When used as a rifle grenade it was launched using "Cartridge .303 inch, Cordite H, Mk. 4".



The body is painted grey with a red filling ring around the top of the body. A black band is located directly underneath the red band. A filling designation, "B2" is stenciled on the black band in white. The designation and directions for its use are stenciled on the body below the two bands. A part number "TW. 7 GF", the empty body manufacturers mark and date are stenciled below the instructions. On the opposite side are the markings for the filling station, date of filling, and lot number.

This was a bursting grenade, designed so that the grenade could not be picked up and thrown back. As such, the grenade had a considerable blast effect that could propel fragments out to a radius of about 30 metres. Use of the grenade was discontinued because of the risk of lethal injury when used against rioters.

Grenade, Hand, Smoke, No. 93

This designation was originally issued to cover the No. 77 Mk. 2 grenade. The grenade was redesignated No. 77 Mk 2 in December 1946 due to the similarity to the No. 77 Mk. I.

Grenade, Rifle, AT, No 94 (Energa)

The No. 94 grenade was a Belgian designed grenade trialed in 1948 then adopted by the British and other Commonwealth countries. In British service it was officially adopted for use in December of 1955 but was in use prior to that date as evidenced by the training manuals dated as early as 1953. The grenades were of Belgian manufacture throughout its use but minor modifications were done in the UK. The grenade was introduced to provide an Infantry section with an effective anti tank weapon. Originally designed for firing from the No. 4 rifle its use was later extended to the L1A1 rifle in British, Australian, and New Zealand service and the C1A1 in Canadian service.

Grenade, Rifle, AT, No. 94 Mk. 1

The grenade consists of a thin sheet metal body containing the charge, inner cone, and detonator. A "Fuze, Percussion, DA No. 9 Mk. 1 or Mk. 2" is screwed into the top of the head. The fuze is covered by a hard rubber cap that would be removed prior to firing. At the apex of the inner cone a safety shroud is fitted that provides a secondary safety device. A tail assembly consisting of tail tube and a set of six fins screws into the tail adapter which then screws into the base of the head covering the detonator housing. A rubber cushion is cemented in a shallow recess at the top of the tail adapter to

TYPE- Anti-tank
WEIGHT- 1.5 lb.
LENGTH- 15.5 in.
DIAMETER- 3 in.
IGNITER- L9A1 or L9A2
FILLING- 11.25 oz.

provide support for the detonator when fitted. The grenade has two safety devices, one prevents the arming of the fuze until the grenade has been fired and the shroud screens the main detonator until the grenade has traveled five or six feet after firing. The filling is RDX/TNT 80/20.

The grenade may be found painted black or olive green with a yellow band without stenciling. It should be noted that the use of a yellow band for an HE filled grenade was not in keeping with normal marking practices. It may also be found painted olive drab with or without a red band and a stenciled marking of "GRENHEAT" or "GREN HEAT Mk. 1" Stenciled markings are in yellow paint.

No. 94 Mk. 1

The grenades are issued unfuzed with a transit plug in the nose and a paper washer at the junction of body and tail assembly. To prepare the grenade for firing, remove the transit plug and screw in the fuze. Prior to screwing in the fuze the grenade should be checked to see if the shroud is in position. The protective rubber cap is then replaced. Unscrew the tail tube and adapter; remove the paper washer and insert the "Detonator No. 107 Mk. 1", open end first. Replace the tail assembly. A launching cartridge is issued with each grenade. The cartridge "SA rifle grenade, .303 inch H Mk. 7Z"is held in a cork plug in the bottom of the stabilizer tube.

When the grenade is fired the fuze in the nose arms and after a short delay, the shroud covering the main detonator is ejected from its housing. The shroud is ejected by mechanical action initiated by the setback of firing. A spring in the housing ejects the shroud once released. On impact a small detonator in the percussion fuze moves forward into the striker and fires. This sends a flash down through the grenade into the main detonator and explodes the main shaped charge.

Grenade, Rifle, AT, No. 94 Mk. 1/1

TYPE- Anti-tank
WEIGHT- 1.5 lb.
LENGTH- 15.5 in.
DIAMETER- 3 in.
IGNITER- L9A1 or L9A2
FILLING- 11.25 oz.

This is the same as the Mk. 1 grenade but used the L9A1 or L9A3 fuze with short "Detonator No. 107 Mk. 1". The L9A1 and L9A2 fuzes are modified to operate by "graze" as well as direct action. This means if the grenade hits on an angle it will still explode on the target and not bounce off.

The grenade is painted olive drab with or without a red band and a yellow stenciled marking of "GRENHEAT" or "GREN HEAT Mk. 1".

A launching cartridge is issued with each grenade. The cartridge "SA rifle grenade, .303 inch H Mk. 7Z"is held in a cork plug in the bottom of the stabilizer tube.

Grenade, Rifle, AT, No. 94 Mk. 2

TYPE- Anti-tank
WEIGHT- 1.5 lb
LENGTH- 15.5 in.
DIAMETER- 3 in.
IGNITER- L9A2 or L9A3
FILLING- 11.25 oz.

This version is virtually identical to previous grenades but is modified by having the rubber cushion at the front of the tail tube sunk below the surface of the tail tube. A rubber washer in a shallow recess replaces the paper washer at the top end of the tail tube. This version also uses a longer detonator, the "Detonator No. 107 Mk. 2" with "Fuze, Percussion, DA, L9A2 or L9A3". A launching cartridge is issued with each grenade held in a cork plug in the bottom opening of the tail tube.

The body is painted olive drab with a red filling ring and markings in yellow. Stenciled markings are "GREN No. 94 Mk. 2" or "GR RIFLE A-Tk No94Mk2".

Grenade, Rifle, AT, No. 94 Mk. 2/1

This is a minor modification of the Mk. 2 grenade to improve the sealing of the detonator housing. It uses the "Fuze,

Percussion, DA, L9A2 or L9A3" and "Detonator No. 107 Mk. 2".

The grenade is painted deep bronze green with a red filling ring around the body and markings in yellow. Stenciled markings give the designation "GREN No. 94 Mk. 2/1", Mecar logo, date of manufacture, and lot number.

A launching cartridge is issued with each grenade. The 7.62mm launching cartridge is held in a cork plug in the bottom of the stabilizer tube.

Grenade, Rifle, Drill, No. 94 Mk. 1

This drill grenade is made exactly as the live version but with no explosive fillings. These grenades are not meant to be used for firing practice but were designed for use as an instructional tool. The accuracy of construction allows instructors to teach the proper method of fuzing prior to using live grenades.

The head is made of aluminum in the same configuration as the live grenade. The tail assembly is the same as that used on the live grenade. When it is unscrewed it reveals a detonator pocket in the base of the head. The top of the head is threaded to accept a drill fuze assembly. The fuze assembly operates the same as a live fuze but contains no live components. The safety clip has a plastic tag with red instructions printed on it attached by a plastic string.

Early versions are painted black with a yellow band and white markings. Later versions are painted white with black markings. Markings are "GREN, RIFLE A/TK No. 94 MK 1 DRILL, NOT TO BE FIRED", the manufacturers mark and date of manufacture. In the late 1960's a dark blue version was introduced, this being the Nato standard for marking at the time.

The Australians used a version of the drill grenade with a closed set of fins; this was a later modification made by Mecar. Originally painted white with black markings giving the designation "GREN RIFLE A.TK No. 94 MK. 1 DRILL", the Mecar logo and date of manufacture. The markings were later changed to the Nato standard dark blue with white markings. The markings include the designation "GREN RIFLE A.TK No. 94 MK. 1 DRILL" and an instruction "NOT TO BE FIRED", the Mecar logo, and date of manufacture.

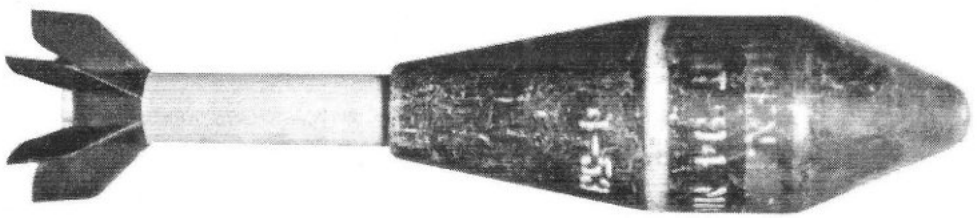
No. 94 Mk. I Drill

Grenade, Rifle, Practice, No. 94 Mk. 1

This version had a weighted wooden head with metal tail assembly. Only a few of these were purchased during the trials of 1948 and did not make it into normal service. No other information is currently available.

Grenade, Rifle, Practice, No. 94 Mk. 2

Used for firing practice, the head is a solid piece of aluminum turned to resemble the shape of the live grenade. The nose is rounded and has no provisions for fitting a fuze. The base is internally threaded to engage the tail tube. Originally the tail tube was reduced at the bottom end to accept a tail unit. The tail unit consists of the fins and two circlips. One circlip abuts the shoulder formed on the tail tube by the reduction and acts as a distance piece. The other circlip fits into a groove in the tube and holds the fins onto the tail tube.



In later issues, the tail unit designed for the "Grenade, Rifle, Practice Marker, L1A1" was substituted. The tail unit is composed of a tail tube permanently fitted with a set of 6 fins. It is threaded at the top end to match threading in the

base of the head. The grenade is painted black with a yellow band around the middle of the body. Markings in white are "GREN DRILL AT 94 MK2" and the month and year of manufacture. Later issues of the grenade are painted light blue with white markings.

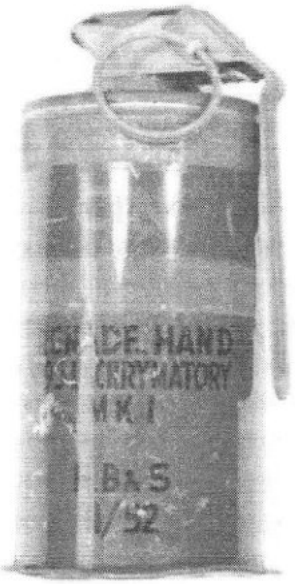
Note: This is the same grenade used by the Americans as the M29. The American grenades are painted black with white markings or may be found painted light blue with white markings.

Grenade, Hand, Lachrymatory, No 95 Mk. 1

TYPE- Gas
LENGTH- 4.5 in. body only
DIAMETER- 2.25 in.
IGNITER- No. 3 Mk. 1/1
FILLING- 4 oz.

This grenade was adopted for use in February 1952 and declared obsolete in April 1958. It was designed to emit for 8 seconds with enough violence to discourage handling after being thrown and then explode to produce a larger lachrymatory cloud. This was to avoid the lethality of the No. 92 grenade.

The body is a tinplate cylinder similar to the No. 83 grenade. The top plate has a roll threaded socket to fit the striker mechanism. There are four emission holes evenly spaced around the socket that are sealed by adhesive tape. Contained within the body is an internal canister perforated all over the sides with a central channel the full distance of the canister. The inner canister is filled with four ounces of PN748, a lachrymatory compound. A primed cambric disc is placed on top of the filling. A 60-grain burster is placed in the central channel and is held at the top end by a cannelure in the channel. A tin cap closes the bottom of the internal canister and holds the bottom of the burster in position. A cap seamed onto the main cylinder closes the bottom of the grenade. A "Striker Mechanism, No. 3 Mk. 1/1 screws into the top socket over an "Igniter, Grenade, No. 1 Mk. 1".



No. 95 Mk. 1
Photo - Norman Bonney

The grenade is painted grey with a red filling ring around the top. A red band around the centre of the body is stenciled with the code "CN". The designation, manufactures mark, date of filling and lot number will be stenciled on the body.

The grenade was issued unprimed. To prime the grenade, unscrew the striker mechanism, insert the igniter and replace the striker mechanism. The grenade is then ready for use.

Grenade, Hand, Anti-riot, Irritant, L1A1

TYPE- Gas
WEIGHT- 400 g
LENGTH- 140 mm overall
113 mm body
DIAMETER- 65 mm
IGNITER- No. 3 Mk. 1
FILLING- 193 g

The L1A1 Anti Riot grenade was adopted for use in 1959.

The basic construction is similar to the No. 91 Mk. 2 grenade. The most noticeable difference is the location of the emission holes. On the L1A1 they are located on the sides of the body in three rows of three holes. The emission holes are then covered by a strip of transparent tape. The filling is PN 765 in early fillings, later PN770 CS gas pellets.

The main body of the grenade is painted grey with two red bands painted around it. One band is located near the top of the grenade, the other about mid way down the body. The letters "CS" are painted above the lower band. The designation "GRENADE A/RIOT IRRT L1A1" is painted in black below the band. Other markings include the lot number, date of manufacture, date of filling, fillers mark, and manufacturers marking.

Grenade, Hand, Anti-Riot, Irritant, L1A2

TYPE- Gas
LENGTH- 140 mm overall
113 mm body
DIAMETER- 65 mm
IGNITER- No. 3 Mk. 1/3
FILLING- 193 g

This grenade replaced the L1A1 version. It may be hand thrown or dispensed from light aircraft.

The body is constructed in the same manner as the L1A1. The emission holes are located on the side of the body in three rows of three holes and are covered by a transparent tape. There is an internal canister, perforated all over with 4mm holes, that contains the filling of 193 grams of pressed CS composition. A "Striker Mechanism, No. 3 Mk. 1/3" screws into the adapter mounted in the top closing cap. An "Igniter, Grenade, No. 1 Mk. 2" is used in this grenade. When initiated, this grenade produces gas for 10-40 seconds.

The main body of the grenade is painted grey with two red bands painted around it. One band is located near the top of the grenade, the other about mid way down the body. The letters "CS" are painted in red above the lower band. The designation "GRENADE A/ RIOT IRRT L1A2" is painted in black below the band. Other markings include the lot number, date of manufacture, date of filling, and manufacturers marking.

L1A2
Photo - Ray Ford

Grenade, Hand, Anti-Riot, Irritant, L1A3

TYPE- Gas
LENGTH- 140 mm overall
113 mm body
DIAMETER- 65 mm
IGNITER- No. 3 Mk. 1/3
FILLING- 210 g

This version closely resembles the others of the series but has a reinforced baseplate making it suitable for rifle or vehicle mounted dischargers. It uses a standard "Striker Mechanism, No. 3 Mk. 1/3. The body contains a solid block of CS producing composition weighing 210 grams.

The main body of the grenade is painted grey with two red bands painted around it. One band is located near the top of the grenade, the other about mid way down the body. The letters "CS" are painted in red above the lower band. The designation "GRENADE A/RIOT IRRT L1A3" is painted in black below the band. Other markings include the lot number, date of manufacture, date of filling, and manufacturers marking.

The manufacturer of this grenade was Schermuly Ltd, High Post, Salisbury.

Grenade, Rifle, Practice Marker, L1A1

These grenades are used for firing practice for the No. 94 (Energa) grenade and as such may also be known as "Grenade, No. 94, Practice Marker". Originally the British Government intended to purchase six varieties from Mecar in Belgium.

TYPE- Practice
LENGTH- 216 mm
DIAMETER- 74 mm
IGNITER- None
FILLING- Chalk

These were to be numbered consecutively from L1A1 to L6A1. The L1A1 had a white head and the other colours were to be blue, light blue, green, red, and chamois. Eventually only the L1A1 was adopted and separate heads in differing colours procured.

The body is made of hard rubber screwed onto an aluminum adapter. A tail tube assembly screws into the adapter and is replaceable when damaged. The heads are made of plastic filled with a coloured marking powder. The heads are easily replaced after use as the fired one breaks up on impact. The heads are provided in white, red, blue, green, and yellow.

The grenade is basically blue, with the tail tube and fins a light blue, and the adapter and head a darker blue. Many are found with black fins, these are from the No. 94, Practice Mk. 2, the spare fins being used to repair either version. Marking are in white and give the designation "GREN RIFLE PRAC MARKER L1A1". The Mecar logo and year of manufacture are also marked on the body.

The original designations for the grenades were:
Grenade, Rifle, Practice Marker, L1A1- White head
Grenade, Rifle, Practice Marker, L2A1- Green
Grenade, Rifle, Practice Marker, L3A1- Chamois
Grenade, Rifle, Practice Marker, L4A1- Red
Grenade, Rifle, Practice Marker, L5A1- Light Blue
Grenade, Rifle, Practice Marker, L6A1- Dark Blue

Drill Grenade, Discharger, Smoke, L1A1

TYPE- Drill
WEIGHT- 425-485 g
DIAMETER- 66 mm
FILLING- Portland cement

This is the inert training version for use with the vehicle mounted dischargers. It is used in place of all versions of discharger grenades for training. These grenades are manufactured by "Royal Ordnance Factories".

The grenade is constructed in the same manner as the L5 grenades but of empty components. This grenade is filled with Portland cement to give a weight of between 425 and 485 grams.

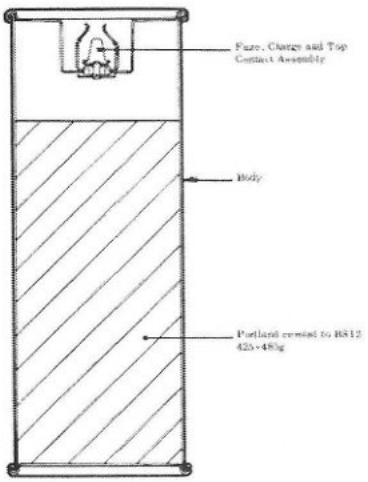
The grenades are painted Oxford blue and have white markings. The markings give the designation of the grenade and will contain the word "DRILL".

Drill Grenade, Discharger, Smoke, L1A2

TYPE- Drill
WEIGHT- 880-890 g
DIAMETER- 66 mm
FILLING- Portland cement

This version is constructed similarly to the L5A4 having a body seam welded by an electrical welding process called "Soudronic Welding". The filling of Portland cement is also increased to give a weight of 880-890 grams.

The grenades are painted Oxford blue and have white markings. The markings give the designation of the grenade and will contain the word "DRILL".



Drill Grenade, Discharger, L1A1

Grenade, Hand-Rifle, Anti Personnel, L2A1

This grenade replaced the No. 36M Mk. I in British Service in 1964. In 1952 a Tripartite Infantry Conference the characteristics for a fragmentation hand grenade were laid out. In effect, the body of the grenade was to be common but the agreement allowed each country to select its own fuze providing that the fuzes of all countries were interchangeable. The L2A1 was the British grenade adopted as a result. The

TYPE- Fragmentation
WEIGHT- 465 g
LENGTH- 106 mm overall
79 mm body
DIAMETER- 66 mm
IGNITER- L25A3 or L25A4
FUSE DELAY- 3.8-5.5 sec.
FILLING- 170 g RDX/TNT

grenade was designed to be thrown by hand or fired from a rifle with the addition of an L1 adapter. The manufacturer is Royal Ordnance Factories.

L2A1 Fragmentation

The body is egg shaped and made of tinned plate in two parts. The lower part is 1.45 inches high with a large filling hole in the bottom. After filling the hole is closed by a disc and closing cap. The top portion is 1.6 inches high and has a fuze well mounted in the top to hold the L25 fuze mechanism. The two parts are rolled and seamed together in the centre. The body is lined by a notched wire fragmentation liner and filled with 170 grams of RDX/TNT. The wire liner is made of 2.4mm square wire notched at intervals of 3.2mm. The fuze holder consists of an elongated cylindrical brass liner and a tinned brass adapter. The adapter is internally threaded to match the threading on the fuze mechanism. The liner is closed at one end and enlarged at the other. The adapter is assembled into the enlarged end of the liner and secured in position by soldering. The L25 fuze mechanism consists of a striker assembly and adapter assembly with detonator, delay pellet, and cap housing. The delay element gives a delay of 3.8 -5.5 seconds. The fuze has gone through a number of modifications. In the period 1979-1980 the fuze mechanism being used with the L2A1 was the L25A3 or L25A4.

The grenade is painted deep bronze green with markings in yellow. A yellow band is painted around the top of the grenade just below the fuze mechanism. Early models had a red filling ring. Markings give the designation, lot number, manufacturers initials, date, filling station and date of filling.

For use, the safety lever is held close to the body and the safety pin removed. When the grenade is thrown the striker spring reasserts itself and rotates the striker on its axis pin. As the striker rotates it throws the safety lever off. The striker continues to rotate until it strikes the percussion cap. The percussion cap fires and the resulting flash ignites the delay pellet. The delay pellet burns down to the detonator which fires and initiates the main filling.

Grenade, Hand-Rifle, Anti Personnel, L2A2

TYPE- Fragmentation
WEIGHT- 395 g
LENGTH- 106 mm
DIAMETER- 66 mm
IGNITER- L25A6
FUSE DELAY- 3.9-4.9 sec.
FILLING- 170 g RDX/|TNT

This grenade replaces the L2A1 in British Service. It is simply a modification of the L2A1 to ease production. This grenade may still be in service but is being replaced by the RO 01A1 grenade.

The body is constructed in the same manner. The body is made of tinned plate in two parts. The lower part is 1.45 inches high with a large filling hole in the bottom. After filling the hole is closed by a disc and tinplate closing cap. The top portion is 1.6 inches high and has a fuze well mounted in the top to hold the fuze mechanism. The fuze holder in the L2A2 is the significant difference between the two grenades. In the L2A2 it has been modified to ease production. The fuze holder consists of a brass liner closed at one end and enlarged at the open end. The top end is lipped enabling the liner to be soldered to the underside of the upper body. A tinned brass adapter fits inside the enlarged portion of the liner with the underside of the adapter flange resting on the top of the grenade body. It is retained in position by a soldered joint. The adapter is threaded internally to accept the L25 fuze mechanism. The two body parts are rolled and seamed together in the centre. The body is lined by a fragmentation liner made of 2.4 mm square steel wire notched throughout its length at intervals of 3.175mm. The grenade is filled with 170 grams of RDX/TNT. This grenade uses the L25A6 fuze mechanism that gives a delay of 3.9 - 4.9 seconds.

The grenade is painted deep bronze green with markings in yellow. A yellow band is painted around the top of the grenade just below the fuze mechanism. Markings give the designation, lot number, manufacturers initials, date, filling station and date of filling.

Grenade, Hand, Anti-Riot, Irritant, L2A1

TYPE- Gas
WEIGHT- 480 g
LENGTH- 174 mm overall
150 mm body
DIAMETER- 72 mm
IGNITER- No. 3 Mk. 1/4
FILLING- 285 g

This grenade was in limited production in 1971.

The main body of this grenade is a cylindrical rubber container. It is closed at the top end by a tinplate cap with an adapter mounted in the centre. A "Striker Mechanism, No. 3 Mk.1/4 screws into the adapter. Below the striker mechanism is an "Igniter Grenade, No. 1 Mk. 2 leads down into a small bursting charge.

Inside the body are approximately 400 pellets of PN799 primed with PN859. When the grenade is thrown the striker mechanism fires the percussion cap in the igniter. The percussion cap ignites the delay fuze that burns down and ignites the bursting charge. The bursting charge ignites the pellets and at the same time bursts the body and scatters the burning pellets. This prevents the grenade from being picked up and thrown back.

The main body of the grenade is black with a red band around the centre. Markings are stenciled in white on the body and give the designation, lot number, date of filling and manufacturers marking.

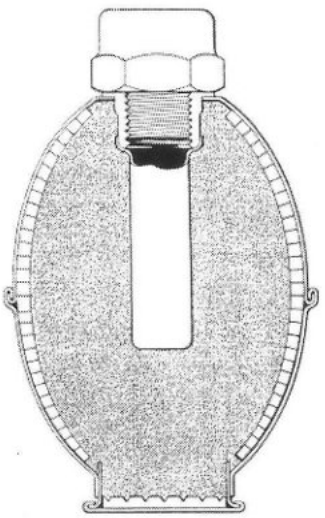
Grenade, Hand-Rifle, Practice, L3

The L3 group of grenades is designed as practice versions of the "Grenade, Hand-Rifle, Anti-Personnel, L2". These grenades are used for training in both the hand and rifle role. They were introduced in 1965, shortly after the L2 grenade was adopted as standard.

Grenade, Hand-Rifle, Practice, L3A1

TYPE- Practice
WEIGHT- 450 g
LENGTH- 96 mm
DIAMETER- 66 mm
IGNITER- None normally
FILLING- 170 g

The grenade body is of the same construction as the L2A1 grenade but is filled with an inert filling of R. D. 1058. The body is lined with the presegmented fragmentation wire liner and has a presegmented fragmentation disc in the bottom closing cap. A fuze holder is fitted into the top of the body and closed by a hexagonal plug. The fuze holder consists of an elongated cylindrical brass liner and a tinned brass adapter. The adapter is internally threaded to match the threading on the plug. The liner is closed at one end and enlarged at the other. The adapter is assembled into the enlarged end of the liner and secured in position by soldering. These grenades are not issued with a fuze mechanism.



L3A1

Grenades have been modified by drilling a 2.5mm hole through the plug to allow a safety pin and ring to be fitted to the plug for added realism. Training manuals indicate that a fuze mechanism is not to be fitted but the grenades may be found with expended L134 fuze mechanisms or L30 drill fuze mechanisms instead of the plug.

The grenade is painted light blue with white markings. Markings give the designation, filling details, lot number and manufacturers initials. Typical markings are "GREN PRAC L3A1 HE SUB".

Grenade, Hand-Rifle, Practice, L3A2

TYPE- Practice
WEIGHT- 450 g
LENGTH- 96 mm
DIAMETER- 66 mm
IGNITER- None normally
FILLING- 170 g

The grenade body is of the same construction as the L2A2 grenade but is filled with an inert filling of R. D. 1083. The body is lined with the fragmentation wire liner and has the fragmentation disc in the bottom closing cap. A fuze holder is fitted into the top of the body. The fuze holder consists of an elongated cylindrical brass liner that is closed at the lower end with an enlarged portion at the top. It is flanged at the top of the enlarged portion, which allows the liner to be soldered to the underside of the outer grenade casing. The threaded tinned brass adapter fits inside the enlarged portion of

the liner with the underside of its flange resting on the top of the grenade body. The adapter is retained in position by a soldered joint with the upper body. The adapter is closed by a hexagonal plug. These grenades are not issued with a fuze mechanism. A press fit steel core is fitted to the inside of the filling hole prior to filling.

Grenades have been modified by drilling a 2.5mm hole through the plug to allow a safety pin and ring to be fitted to the plug for added realism. Training manuals indicate that a fuze mechanism is not to be fitted but the grenades may be found with expended L134 fuze mechanisms instead of the plug.

The grenade is painted light blue with white markings. Markings give the designation, filling details, lot number and manufacturers initials. Typical markings are "GREN PRAC L3A2 HE SUB".

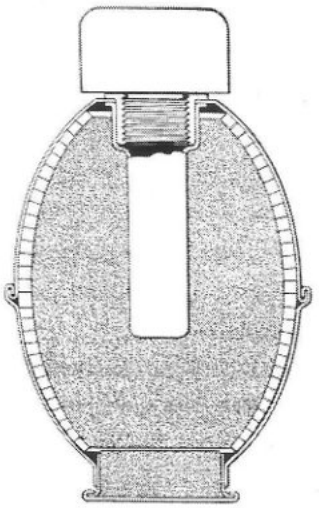
L3A2

Grenade, Hand-Rifle, Practice, L3A3

TYPE- Practice
WEIGHT- 450 g
LENGTH- 96 mm
DIAMETER- 66 mm
IGNITER- None normally
FILLING- 170 g

This version differs from the earlier versions in the design of the plug for the fuze holder. This one is larger and has no hexagonal portion. The design of the lower flange is also different; it is filled with an inert composition and does not have the fragmentation disc in the bottom.

Grenades have been modified by drilling a 2.5mm hole through the plug to allow a safety pin and ring to be fitted to the plug for added realism. Training manuals indicate that a fuze mechanism is not to be fitted but the grenades may be found with expended L134 fuze mechanisms instead of the plug.


L3A3

The grenade is painted light blue with white markings. Markings give the designation, filling details, lot number and manufacturers initials. Typical markings are "GREN PRAC L3A3 HE SUB".

Grenade, Hand-Rifle, Drill, L4

This is the drill version of the L2 anti personnel grenade. It is for use in classroom instruction in mechanism but is not for use in throwing practice. They were introduced in 1965, shortly after the L2 grenade was adopted as standard.

Grenade, Hand-Rifle, Drill, L4A1

TYPE- Drill
WEIGHT- 450 g
LENGTH- 105 mm overall
79 mm body
DIAMETER- 66 mm
IGNITER- L30
FILLING- 170 g

The grenade is constructed in the same manner as the live L2A1 grenade. It is filled with an inert filling of R.D. 1058 and is fitted with the "Fuze, Grenade, Percussion, Drill, L30".

The L30 fuze mechanism is constructed in the same manner as a live L25 fuze but has a rubber closing plug in place of the percussion cap and dummy detonator. The detonator is filled with a hardwood dowel and has a hole drilled through it for identification. The safety lever is painted dark blue and is marked on the top of the lever in white. Markings give the designation and lot number containing the manufacturers initials. Markings also include the word "DRILL".

L4A1

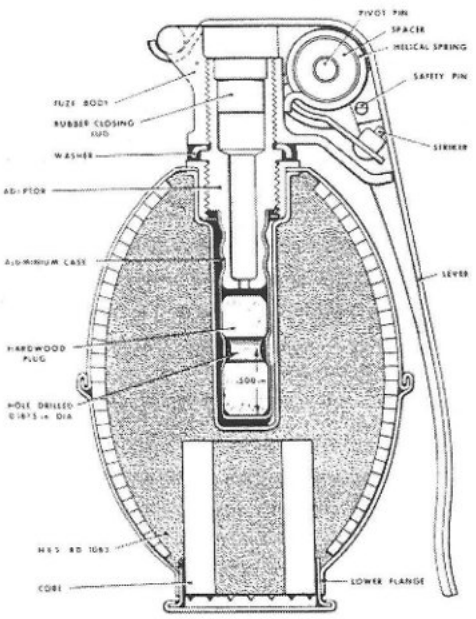
The grenade is painted oxford blue with markings in white. Markings give the designation,

manufacturers initials, and filling. Typical markings are "GREN DRILL L4A1 HE SUB".

Grenade, Hand-Rifle, Drill, L4A2

TYPE- Drill
WEIGHT- 450 g
LENGTH- 105 mm
DIAMETER- 66 mm
IGNITER- L30
FILLING- 170 g

The grenade is constructed in the same manner as the live L2A2 grenade. It is filled with an inert filling of R.D. 1083 which is an improved filling suitable for all climatic conditions. In addition it has the same steel core as the L3A2 and is fitted with the "Fuze, Grenade, Percussion, Drill, L30A2".



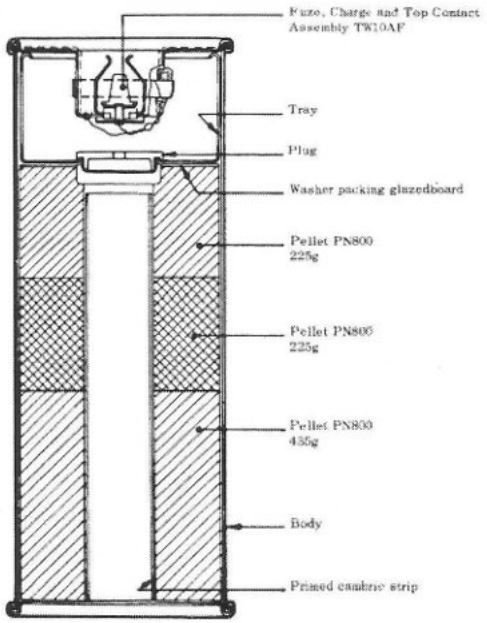
L4A2

The grenade is painted oxford blue with markings in white. Markings give the designation, manufacturers initials, and filling. Typical markings are "GREN DRILL L4A2 HE SUB".

Grenade, Discharger, Smoke Screening, L5A1

TYPE- Smoke, Screening
WEIGHT- 885 g
LENGTH- 180 mm
HEIGHT- 178 mm
DIAMETER- 66 mm
IGNITER- F53 Electric
FILLING- 660 g

This grenade is designed for projection from a smooth bore launcher with an electrical firing circuit. The dischargers are normally vehicle mounted but the grenade can also be projected from the "Grenade. Discharger, L1A1". They cannot be hand thrown. Designed in about 1965 this grenade was obsolete by 1979.



L5A1

The body of the grenade is a cold drawn seamless steel tube with a tinplate base rolled and seamed on. It has a filling of three pre-pressed pellets of PN800. The first (bottom) pellet contains 435 grams of composition, the upper two have 225 grams. . The pellets have one-inch hole running through the centre with a primed cambric strip running down the hole. The pellets are topped by a glazeboard washer. An aluminum tray with a one-inch hole in the centre is then inserted in the top of the grenade. The grenade is closed at the top end by a top cap that contains the fuze, propelling charge and top contact. Eight emission holes are located in the top cap surrounding the fuze. This version uses a propelling charge of 2.6 grams of gunpowder. The grenade is electrically fired from inside the vehicle. When fired the gunpowder propelling charge performs two functions, it ignites the primed cambric strip that ignites the main filling and discharges the grenade from the launcher to a distance of 50 to 80 metres. The smoke screen begins almost immediately but takes approximately 8 seconds to build up and will last for 30-50 seconds.

The grenade is painted deep bronze green with a wide light green band around the top. Markings on the body, also in light green, give the designation "GREN DSCHGR SMK L5A1", lot number, filling code, manufacturers mark and date of manufacture.

Grenade, Discharger, Smoke Screening, L5A2

This version is constructed in the same manner as the L5A1 but has a propelling charge of 2.92 grams, giving a slightly longer range. Emission holes are located around the top cap of the grenade. The smoke composition gives off white smoke that takes approximately 8 seconds to build up to an effective screen and will last for 30-50 seconds.

The grenade is painted deep bronze green with a wide light green band around the top. Markings on the body give the designation "GREN DSCHGR SMK L5A2", lot number, filling code, manufacturers mark and date of manufacture.

Grenade, Discharger, Smoke Screening, L5A3

This grenade is similar to the L5A2 but has the body seam reinforced by a spot welded steel strip.

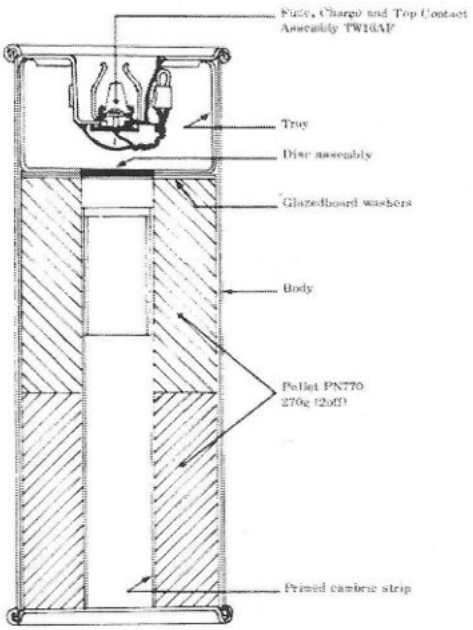
Grenade, Discharger, Smoke Screening, L5A4

This version differs from the L5A3 in that the body is seamed by an electric welding process called "Soudronic Welding".

Grenade, Discharger, Anti-Riot, Irritant, L6A1

TYPE- Gas
WEIGHT- 700 g
LENGTH- 178 mm
DIAMETER- 66 mm
IGNITER- F53 Electric
FILLING- 540 g

This grenade is also designed for projection from a smooth bore launcher with an electrical firing circuit. The dischargers are normally vehicle mounted but the grenade can also be projected from the "Grenade. Discharger, L1A1". They cannot be hand thrown. It was introduced for service in 1966.



L6A1

Constructed from the same empty components as the L5 this grenade has a filling of two pre-pressed pellets of PN770 each containing 270 grams. The pellets have a symmetrical perforation lined with of cambric primed with SR252. The propelling charge is 2.59 grams of gunpowder giving the grenade a range of 50-60 metres when fired from the Discharger, Grenade, L1A1.

Grenade, Discharger, Smoke Screening, L7A1, Green

TYPE- Smoke, Screening
WEIGHT- 545 g
LENGTH- 178 mm
DIAMETER- 66 mm
IGNITER- F53 Electric
FILLING- 545 g

This grenade is designed for projection from a smooth bore launcher with an electrical firing circuit. The dischargers are normally vehicle mounted but the grenade can also be projected from the "Grenade. Discharger, L1A1". They cannot be hand thrown. It was introduced for service in 1966.

The L7 is generally similar to the L5 in construction and use. This grenade is filled with two pellets of PN821 weighing 270 grams and 275 grams respectively. The propelling charge is 2.27 grams of G20 gunpowder. Emission holes are located around the top cap of the grenade. This smoke composition gives of green smoke. The smoke screen takes approximately 8 seconds to build up and will last for 30-50 seconds.

The grenade is painted deep bronze green with a wide light green band around the top. Markings on the body give the designation "GREN DSCHGR SMK SCR GREEN L7A1", lot number, filling code, manufacturers mark and date of manufacture.

Grenade, Discharger, Smoke Screening, L8A1

TYPE- Smoke, Screening
WEIGHT- 765 g
LENGTH- 183 mm
DIAMETER- 66 mm
IGNITER- F92 Electric
FUSE DELAY- 1 sec.
FILLING- 360 g

This grenade is manufactured by Royal Ordnance Plc. and has also been adopted by United States forces.

This grenade consists of a cylindrical moulded rubber body closed by a nut assembly and fitted on top with a metal cylinder, electric fuze, and contact assembly. The filling is 360 grams of a 95/5 mixture of Red Phosphorous and butyl rubber. A plastic burster tube containing 15 grams of G20 gunpowder passes through the centre of the body.

When fired, the propellant charge sends the grenade 20-30 metres. After a delay of .75 seconds, the bursting charge fires (at a height of about 6 metres), bursting the rubber and scattering the filling and producing an immediate white smoke screen that will last for up to 3 minutes in a 24 km/h wind.

The rubber body is coloured black with a light green cylinder assembly. A band around the top of the cylinder is mid-brown. Stenciled markings are also in mid-brown and give the designation "GREN DSCHGR SMK SCR L8A1", filling code, lot number, manufacturers marking, and date of manufacture.

Grenade, Discharger, Smoke Screening, L8A3

TYPE- Smoke, Screening
WEIGHT- 765 g
LENGTH- 185 mm
DIAMETER- 66 mm

The rubber body is coloured black with a light green cylinder assembly. A band around the top of the cylinder is mid-brown. Stenciled markings are also in mid-brown and give the designation "GREN DSCHGR SMK SCR L8A3", filling code, lot number, manufacturers marking, and date of manufacture.

This grenade has also been adopted by US Forces.

Grenade, Discharger, Smoke Screening, L8A4

TYPE- Smoke, Screening
WEIGHT- 680 g
LENGTH- 185 mm
DIAMETER- 66 mm
FUSE DELAY- .75 sec.

This grenade is in service with British forces and has also been adopted by the US Army. It is manufactured by "British Aerospace Defence Ltd. Royal Ordnance Division, Chorley".

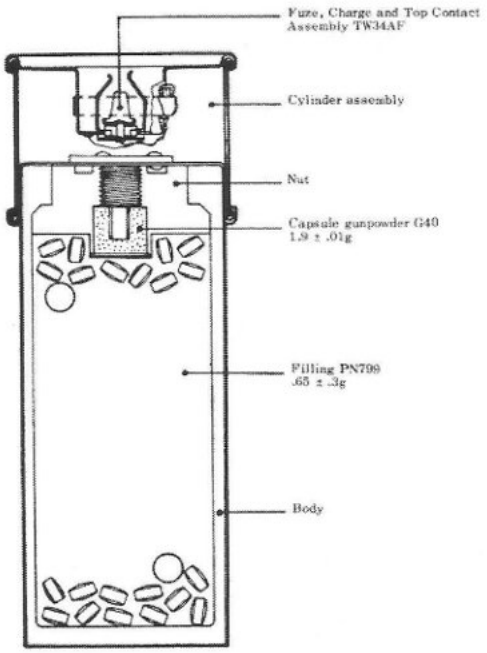
The filling is a 95/5 mixture of Red Phosphorous and butyl rubber. A plastic burster tube containing gunpowder passes through the centre of the body.

The rubber body is coloured black with a light green cylinder assembly. A band around the top of the cylinder is mid-brown. Stenciled markings are also in mid-brown and give the designation "GREN DSCHGR SMK SCR L8A4", filling code, lot number, manufacturers marking, and date of manufacture.

Grenade, Discharger, Anti-Riot, Irritant, L9A1

TYPE- Gas
DIAMETER- 66 mm
IGNITER- F92 Electric
FILLING- 740 g

This grenade is designed for firing from smooth bore launchers with electric firing circuits. These can be vehicle-mounted dischargers or the "Grenade Discharger L1A1". The grenade will travel between 50 and 70 metres. These grenades cannot be thrown by hand. This grenade had been declared obsolete by 1979.



L9A1

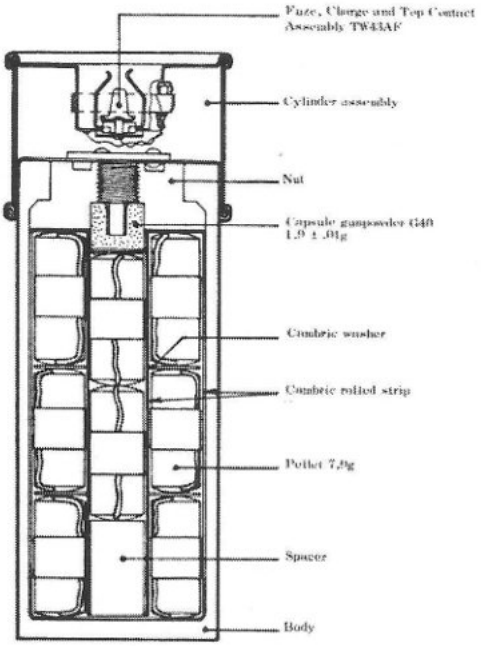
The body consists of a rubber cylinder, nut assembly, and cylinder assembly. The rubber body is a hollow cylinder 5.8 inches long and 2.4 inches diameter. The body is filled with approximately 400 specially primed pellets of instant gas generating compound. Each pellet weighs approximately 1.85 grams. The pellets are pill shaped and are 9.5 mm diameter. The nut assembly is made from aluminum alloy and is bored out to accept the exploder capsule. The exploder capsule is a celluloid top and body containing 1.9 grams of G40 gunpowder. The capsule is sealed into the nut assembly by an aluminum washer that then has the lip of the nut assembly rolled over retaining it in place. A recess in the top of the celluloid capsule is coated with PN623 to assist in ignition by the delay element. The top of the nut assembly is bored out to accept the delay element. The delay element consists of a mild steel bush riveted in three places to the top surface of the tray. The bush is bored out and filled with two elements of G20 gunpowder and three increments of SR 207 separating the gunpowder elements. The cylinder is cold drawn seamless steel tubing or rolled tinplate with soldered joint. The top plate has three parts, the "Fuze, Electric, No. F92 Mk. 2C", the top contact, and the gunpowder propelling charge.

The rubber cylinder is black; the fuze portion of the grenade is painted grey with black markings. Markings include the designation "GRENADE DISCHARGER A/R IRRITANT L9A1 (MEDIUM RANGE)", lot number, filling details, and manufacturers markings.

Grenade, Discharger, Anti-Riot, Irritant, L11A1 (Long Range)

TYPE- Gas
WEIGHT- 550 g
LENGTH- 189 mm
DIAMETER- 66 mm
FILLING- 181.7 g PN770

This grenade is designed for firing from smooth bore launchers with electric firing circuits. These can be vehicle mounted dischargers or the "Grenade Discharger L1A1". The grenade will travel between 50 and 80 metres. These grenades cannot be thrown by hand.



L11A1

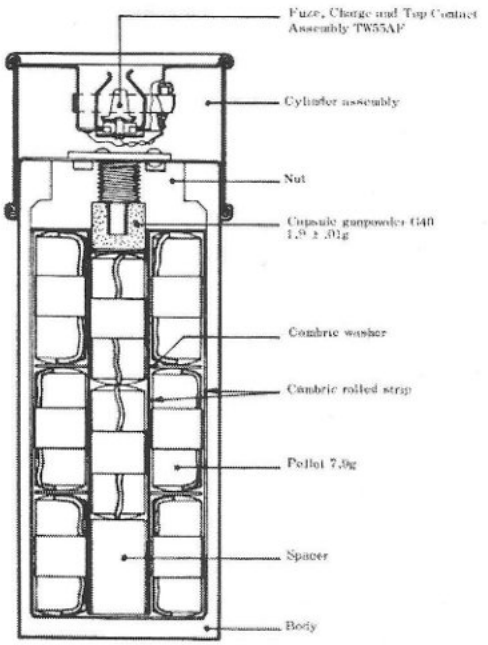
The body consists of a rubber cylinder closed by a nut assembly that is attached to a sheet metal section containing the propelling charge and fuze assembly. The filling consists of 23 aluminum cased CS pellets ignited by cambric strips. The "Fuze, Electric, No. F92 Mk. 2C" both propels the grenade out of the discharger and ignites a short delay element. The 3 second delay element ignites the ignition charge which then ignites the filling. The build up of gases force the rubber body to expand and fracture scattering the burning CS pellets over an area of 25-30 metres. CS gas is produced by the burning pellets for 8-9 seconds. The gas cloud remains effective for a longer period, depending on weather conditions.

The rubber cylinder is black; the fuze portion of the grenade is painted grey with black markings. There is a red band painted around the rubber body and the marking "CS" to denote the filling. Other markings include the designation "GREN DSCHGR A RIOT IRRT LR L11A1 ", lot number, filling details, and manufacturers markings.

Grenade, Discharger, Anti Riot, Irritant, L12A1 (Medium Range)

TYPE- Gas
DIAMETER- 66 mm
FILLING- 181.7 g PN770

The L12A1 is similar to the L11A1 but was introduced to cover the intermediate range between the hand thrown grenade, 25 metres, and the L11A1 with a range of 50-80 metres. As such the delay and propellant charges are different.



L12A1

The propellant charge is 2.27 grams of G12 gunpowder. The delay element consists of three increments of G40 gunpowder, one of 0.1 grams and two of 0.13 grams.

Grenade, Anti-Riot, Irritant L13A1

TYPE- Gas
WEIGHT- 583 g
DIAMETER- 66 mm
IGNITER- No. 3 Mk. 1/4
FUSE DELAY- 2 sec.

This is a bursting type CS gas grenade used to disperse rioters in the open or in buildings. It is currently in use in the British Army.

The body of the grenade is a molded rubber cylinder, similar to the discharger launched grenades. The top cap is tinplate with an adapter for the striker mechanism is permanently attached. The striker mechanism, No. 3 Mk.1/4, is screwed into the adapter over an "Igniter, Grenade, No. 3 Mk. 1". Contained within the body are a series of 23 aluminum containers holding CS gas pellets as in the L11A1. The containers are linked to an igniter set fixed to the striker mechanism.

L13A1

The rubber body is black with a red band painted around the centre. The tin plate cover is painted grey denoting a chemical filling. Markings are in white giving the designation "GREN HAND A RIOT IRRT L13A1", the lot number, manufacturers mark, and date of manufacture. The letters "CS" are painted in red above the band.

When the grenade is thrown, the striker rotates on its axis pin under pressure of the striker spring and forces the safety lever to fly off. The striker continues to rotate and striker the percussion cap. The flash from the cap ignites a 2 second delay element. The delay element ignites the igniter charge which in turn ignites the CS pellets. The gases formed by the burning pellets force the body to expand and fracture scattering the burning pellets over an area of 25-35 metres. The pellets produce gas for between 8 and 9 seconds. The cloud remains effective for a longer period, depending on weather conditions.

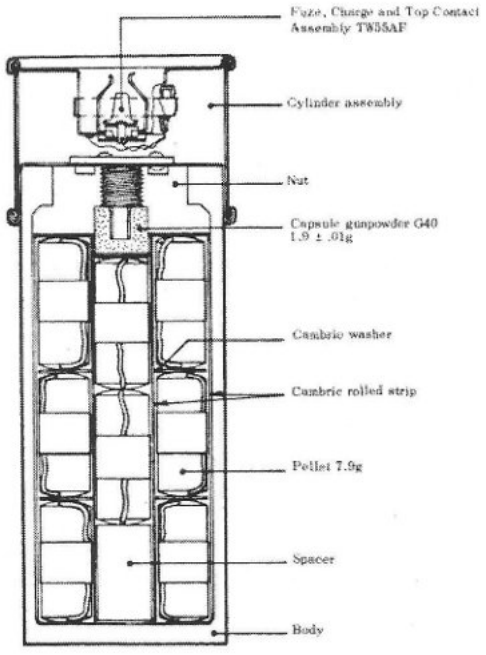
Grenade, Discharger, Practice, Anti-riot, (Long Range), L14A1

TYPE- Practice
WEIGHT- 583 g
LENGTH- 189 mm
DIAMETER- 66 mm

This is the practice version of the L11A1 grenade. As such it is constructed in exactly the same manner but has a filling that produces smoke. The filling is a mixture of PN 829 and cinnamic acid, which is non-toxic and non-irritant. When the rubber body fractures, a number of red smoke emitting pellets are scattered over an area of 25-30 metres. There is a slight incendiary effect from the burning pellets that must be taken into account when using the grenade.

L14A1

The rubber cylinder is black with a light green band painted around it to denote a smoke producing filling. In addition the letters "WM" are painted on the rubber body in light green. The base assembly is painted light blue with white markings. Markings give the designation "GREN DSCHGR PRAC A RIOT LR L14A1", the lot number, manufacturers marking, and date of manufacture.



L15A1

Grenade, Discharger, Practice, Anti Riot, (Medium Range) L15A1

This is the practice version of the L12A1 grenade. It is similar to the design and action of the L14A1 differing only in the delay and propellant charge. The propellant charge is 2.27 grams of G12 gunpowder. The delay element consists of three increments of G40 gunpowder, one of 0.1 grams and two of 0.13 grams.

Grenade, Hand, Practice, Anti-Riot, L16A1

This is the practice version of the L13A1 grenade. The body of the grenade is a molded rubber cylinder, similar to the discharger launched grenades. The top cap is tinplate with an adapter for the striker mechanism is permanently attached. The striker mechanism, No. 3 Mk.1/4, is screwed into the adapter over an "Igniter, Grenade, No. 3 Mk. 1". The filling is cinnamic acid that produces a red, non-toxic, non-irritant smoke.

The rubber body is black with a green band painted around the centre. The tin plate cover is painted light blue denoting a practice grenade. Markings below the band are in white giving the designation "GREN

HAND PRAC A RIOT L16A1", the lot number, manufacturers mark, and date of manufacture. The letters "WM" are painted on the band.

When the grenade is thrown, the striker rotates on its axis pin under pressure of the striker spring and forces the safety lever to fly off. The striker continues to rotate and striker the percussion cap. The flash from the cap ignites a 2 second delay element. The delay element ignites the igniter charge, which in turn ignites the filling. The gases formed by the burning pellets force the body to expand and fracture scattering the burning pellets over an area of 25-35 metres.

Grenade, Discharger, Smoke Screening, Green, Short range, L27A1

TYPE- Smoke, Screening
WEIGHT- 525 g
DIAMETER- 66 mm

The grenade consists of a moulded rubber body mounted on a cylindrical propellant base. It is designed for firing from dischargers with an electric firing circuit. The grenades are issued ready to use without preparation.

The body of the grenade is black; the propellant assembly is light green with markings in black. Markings give the designation "GREN DSCHGR SMK SCR GREEN SHORT RANGE L27A1. The grenades are packed in metal ammunition boxes with an inner cylindrical container. The inner container holds 12 grenades.

When fired the propellant charge ejects the grenade from the discharger to a distance of about 30 metres and ignites a delay charge. After a delay of 1-2 seconds a small charge bursts the body and ignites the smoke pellets. The pellets spread over an area of approximately 1800 mils.

Grenade, Hand, Drill, L28A1

TYPE- Drill
LENGTH- 114 mm
DIAMETER- 61 mm
IGNITER- L30A2

This grenade is designed to replace the L4 Drill and likely the L3 Practice grenades. The body is a solid aluminum turning in the shape of the L2 grenade. It is drilled and tapped to accept an L30 drill fuze.

The L30 fuze mechanism is constructed in the same manner as a live L25 fuze but has a rubber insert in place of the percussion cap. The detonator is filled with a wooden dowel and has a hole drilled through it for identification. The safety lever is painted dark blue and is marked on the top of the lever in white. Markings give the designation "DRILL L30A2" and lot number containing the manufacturers initials. The manufacturer is normally Royal Ordnance Division, Chorley abbreviated "CY".

The grenade is painted dark blue with markings in white. Markings give the designation "DRILL GREN L28A1", manufacturers initials and date of manufacture.

L28A1

Grenade, Hand, Smoke Screening, L34A1

TYPE- Smoke, Screening
LENGTH- 111 mm
DIAMETER- 55 mm
FUSE DELAY- 1-2 sec.
FILLING- 143 g

These grenades were developed in the 1970's by Pains Wessex as an alternative to the No 83 grenade. They are produced in a number of colours but only some were taken into British service. The L34A1 is a screening grenade, producing a large greyish/white smoke cloud. The delay of the L34A1 has also been shortened to 1-2 seconds to assist in rapid screening.

The body consists of a cylindrical tin plate body with a top and bottom secured by folded seams. A roll-threaded neck is centrally mounted in the top. The filling is contained in a rolled paper sleeve sealed at the bottom by a millboard disc and at the top by a perforated tinplate baffle. A central channel in the filling is lined with a perforated metal sleeve. The filling is topped by an igniter composition and primed cambric disc. A primed cambric strip extends down the central channel. Two tinplate baffles separated by millboard spacer's collars take up the space above the filling. A tinplate cap screws onto the neck of the grenade. A plastic cap with serrated edges is mounted on the cap to aid in removal especially when wearing arctic mittens.

The igniter mechanism consists of a plastic body containing a striker and striker spring. The spring bears against shoulders at the top of the body and the head of the striker. The spring is not under tension. A split plastic claw fits over an enlarged portion at the back end of the striker. The claw fits into the top of the body holding it in place. A metal ring is attached at the top end of the claw. A cord runs from the ring on the claw to a ring soldered to the bottom of the cap. Screwed onto the base of the igniter is an aluminum adapter holding a 9mm cap attached to a length of safety fuze. An encapsulated igniter composition is attached at the lower end of the safety fuze. The safety fuze provides a delay of approximately 1-2 seconds.

L37A1
Photo - Ray Ford

The grenade is painted light green with markings stenciled in black. Markings give the designation, lot number, date of manufacture, and manufacturer. The cap of the grenade is white denoting the colour of smoke produced.

For use, grasp the grenade in the throwing hand, with the other hand unscrew the cap and extend to the length of the cord. When the cap is pulled, the claw is drawn out of the body pulling the striker with it. This action compresses the striker spring at the same time. When the claw is fully free of the body it is free to split apart and release the striker. The striker spring, then compressed, reasserts itself driving the striker down onto the percussion cap. The percussion cap fires igniting the safety fuze which in turn ignites the igniter composition. The igniter fires the cambric disc that flashes into the central channel igniting the cambric strip. This ignites the main smoke filling. Smoke will be emitted through the top of the grenade for approximately 45 seconds.

Grenade, Hand, Signal Smoke, L35A1

TYPE- Smoke, Signal
WEIGHT- 275 g
LENGTH- 111 mm
DIAMETER- 55 mm
FUSE DELAY- 3-5 sec.

The L35A1 is a signal smoke grenade made in the same manner as the L34A1. This grenade produces blue smoke for approximately 45 seconds. Delay time is approximately 3 seconds.

The grenade is painted light green with markings stenciled in black. Markings give the designation, lot number, date of manufacture, and manufacturer. In addition, there are 3 "C's" painted in the colour of smoke stenciled below the designation. The colour of smoke is also indicated by the colour of the plastic cap.

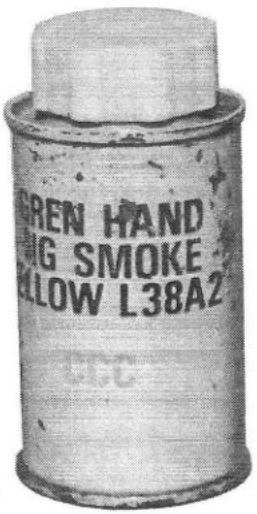
Grenade, Hand, Signal Smoke, L36A1- As above but produces green smoke.
Grenade, Hand, Signal Smoke, L37A1- As above but produces red smoke.
Grenade, Hand, Signal Smoke, L38A1- As above but produces yellow smoke.

Grenade, Hand, Signal Smoke, L35A2

TYPE- Smoke, Signal
WEIGHT- 275 g
LENGTH- 109 mm
DIAMETER- 55 mm
FUSE DELAY- 3-5 sec.

This grenade is slightly modified from the L35A1. The most noticeable difference is the cap that is all plastic.

The grenade is painted light green with markings in black. Markings give the designation, manufacturers mark and date of manufacture. There are three "C's" stenciled below the designation in the colour of smoke produced. In addition the cap of the grenade is made of plastic in the colour of smoke produced by the grenade.



L38A2
Photo - Ray Ford

Grenade, Hand, Signal Smoke, L36A2- As above but produces green smoke.
Grenade, Hand, Signal Smoke, L37A2- As above but produces red smoke.
Grenade, Hand, Signal Smoke, L38A2- As above but produces yellow smoke.

Grenade, Hand, Coloured Smoke, Blue, L46A1

TYPE- Smoke, Signal
WEIGHT- 350 g
LENGTH- 155 mm
DIAMETER- 55 mm
FUSE DELAY- 2-4 sec.

The body of the grenade is a sheet metal canister, cylindrical in shape. The top of the body is formed with a threaded projection. Mounted centrally in the top of the body is an uncocked igniter mechanism. The top of the grenade is closed by a plastic cap that is attached by a lanyard to the igniter mechanism. When the grenade is to be used, the cap is unscrewed and pulled. The action of pulling causes the striker to pull back compressing a spring. When pulled far enough, the clip holding the striker pulls away allowing the striker spring to reassert itself and drive the striker down onto a percussion cap and ignite a 2-4 second delay element. The delay element burns down to the ignition element which ignites the main filling. This grenade is filled with a smoke composition that produces blue smoke. The grenade will emit smoke for about 45 seconds through the top of the body.

L46A1
Photo - Bob Perkins

The design of the igniter mechanism is designed for use while wearing arctic mittens.

The grenade is painted light green with markings in black. Markings give the designation "GREN HAND SIG SMOKE BLUE L46A1". There are 3 "C's" stenciled near the bottom of the body in the same colour as the smoke produced. In addition, the cap closing the top of the grenade is moulded from blue plastic to identify the colour of smoke.

Grenade, Hand, Coloured Smoke, Green, L47A1- As above, but produces green smoke.
Grenade, Hand, Coloured Smoke, Red, L48A1- As above, but produces red smoke.
Grenade, Hand, Coloured Smoke, Orange, L49A1- As above, but produces orange smoke.

Grenade, Hand, Smoke Screening, L50A1

TYPE - Smoke, Screening
IGNITER- L124A1

This is an operational screening or marking smoke grenade that emits a thick cloud of off white smoke. This particular grenade is not suitable for use from aircraft.

The body is tinplate made in the same manner as a tin can. An adapter socket is mounted in the top of the grenade to accept the fuze mechanism. There is a single emission hole in the bottom of the grenade closed by a self-adhesive aluminum foil disc. The body is filled with a burning type smoke composition.

The igniter mechanism used is the L124A1 consisting of a striker mechanism and adapter mechanism. The striker mechanism consists of a metal body, striker, striker spring, safety lever, and safety pin. The adapter mechanism consists of the percussion cap, delay composition, and gunpowder capsule. The adapter is threaded externally in two places, the top to screw into the striker mechanism and the bottom to screw into the grenade body.

The grenade is painted light green with markings in black. Markings give the designation "GREN HAND SMK SCR/ MARKER L50A1", a manufacturers mark, and a lot number. The fuze mechanism is marked on the top of the lever with the designation, manufacturer, and lot number of the fuze.

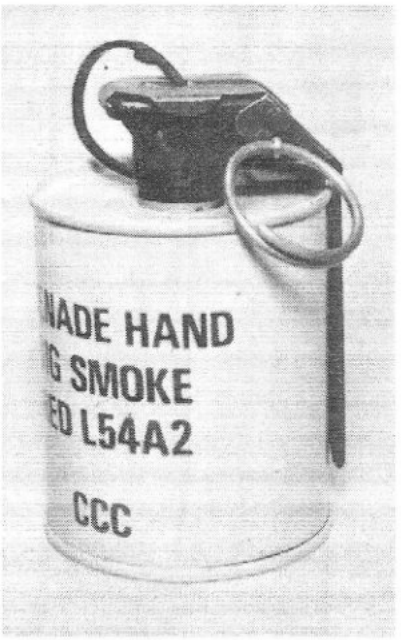
When the safety pin is removed and the grenade thrown, the striker under pressure of the striker spring throws the safety lever off and continues to rotate forward until it hits and fires the percussion cap. The flash from the cap ignites the delay composition and in turn the gunpowder capsule. The gunpowder capsule ignites the main filling. After a short delay the aluminum foil covering the emission hole is blown off allowing the smoke to escape. This grenade will emit smoke for 40-80 seconds

Grenade, Hand, Signal, Smoke, Blue, L52A1, L52A2

This is a signaling type smoke grenade designed to provide a quick and easy method of making a signal at long ranges. The grenade produces a dense cloud of blue smoke. These grenades were manufactured by Brocks Explosives Ltd. Sanquhar.

TYPE- Smoke, Signal
WEIGHT- 283 g
HEIGHT- 106 mm
DIAMETER- 68 mm
FUSE DELAY- 2.5-4 sec.

The body is a cylindrical tinplate body with the top and bottom seamed and rolled on. The top has a central hole with an adapter mounted in it, and two emission holes flanking the central hole. A self-adhesive plastic disc covering the top of the grenade seals the emission holes. A striker mechanism is mounted to the adapter. The striker mechanism is made of plastic with the internal components of metal. The body is filled with smoke compound topped by a delay plate.



L54A2

The grenade is painted light green with the top colour coded to indicate the smoke colour. Markings are in black giving the designation, lot number, and manufacturers marking. The colour of smoke is also indicated by three "C's" (CCC) painted on the lower portion of the body, below other markings, in the colour of smoke produced. The safety lever has stamped markings on top giving the lot number and manufacturers marking.

There are two versions of each grenade; the A1 (e.g. L52A1) series are as noted, the A2 (e.g. L52A2) series are slightly modified. The A2 grenades have a plastic lanyard from the striker mechanism to a hole in the top of the safety lever. This lanyard was designed to remove the hazard of a loose lever flying into the works when throwing the grenades from helicopters.

When the pin is removed and the grenade thrown, the safety lever is thrown off by the striker and striker spring as they rotate on their axis pin. When the lever flies free, the striker continues to rotate until it strikes the percussion cap. The percussion cap fires and ignites the delay plate. The delay plate burns for 2.5 to 4 seconds then ignites the smoke compound. The gasses formed by the burning compounds burst the plastic disc allowing the smoke to escape through the emission holes. Smoke will be emitted for between 30 and 75 seconds.

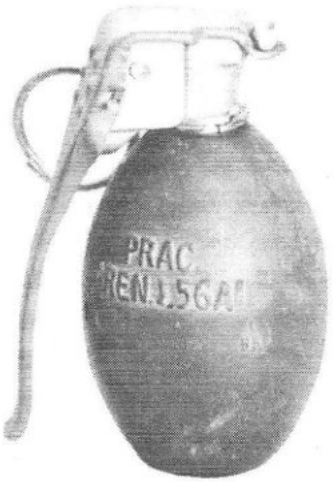
The grenades are packed in individual screw top aluminum containers. The containers are marked with the designation, lot number, manufacturers marking and date of filling.

Grenade, Hand, Signal, Smoke, Green, L53A1, L53A2- As above but produces green smoke.
Grenade, Hand, Signal, Smoke, Red, L54A1, L54A2- As above but produces red smoke.
Grenade, Hand, Signal, Smoke, Orange, L55A1, L55A2- As above but produces orange smoke.

Grenade, Hand, Practice, L56A1

TYPE- Practice
WEIGHT- 465 g
LENGTH- 4.25 in.
DIAMETER- 2.375 in.
IGNITER- L134A1 or L159A1
FUSE DELAY- 3.8 – 5.5 sec.

The L56 grenade originated as a private venture design by Royal Ordnance Factory Chorley. Its original designation was "Grenade, Hand, Training, CY-1". Upon adoption it was changed to L56A1. This grenade is used for practice and may be used for all types of individual or team tactical training so long as it does not involve a live enemy force.



L56A1 with L134A1 Fuze mechanism

The body of the grenade is made of a hard rubber moulded in the shape of the L2 grenade without the centre seam. A metal threaded fuze holder is mounted in the top of the body. A large hole runs from the fuze holder to the bottom of the grenade to allow the fuze detonation to escape without blowing the body apart. A "Practice Fuze, Grenade, Percussion, L134A1" screws into the top of the grenade. The fuze mechanism contains a small spotting charge to give a loud report and puff of smoke when detonated. The safety lever of the fuze is light blue with white markings giving the designation, manufacturer, date, and lot number of the fuze. In addition there is a circle of six

L56A1 with L159A1 Fuze mechanism

raised dots near the safety pin to aid in night identification of the fuze. Recently a new "economy engineered" fuze mechanism, L159A1, was developed for the L56A1. It has a plastic body with a metal safety lever. The safety lever is painted blue and has four raised dots to indicate a practice fuze. It is marked in white on top of the lever with the designation, manufacturer, date of manufacture and lot number. In addition it has "PRAC" stenciled on the lever.

The rubber used in the body is light blue throughout. Embossed on the side of the body is the designation "PRAC GREN L56A1. A manufacturers mark is located below and to the left of the designation; the date of manufacture is located below and to the right.

The bodies and fuze assemblies are issued separately. They are packed in H83 ammunition containers that contain either 10 bodies or 30 fuze assemblies. The container is marked with the designation of the contents, manufacturing, and filling details.

Before use the bodies must be inspected for damage to ensure the detonation aperture is free from obstructions and the body has no splits longer than 25mm. If a split longer than 25mm is found or a split is found in the upper half of the body, the grenade body is condemned. The bodies may be used up to 10 times with a live fuze mechanism, after that, they are condemned and may only be used for throwing practice with or without an inert fuze mechanism.

Grenade, Hand, Stun, L60A1

This is a stun grenade manufactured by Royal Ordnance Factories, unfortunately I have no other information.

Grenade, Hand, Signal smoke, L64A1

TYPE- Smoke, Signal
LENGTH- 138 mm
DIAMETER- 62 mm
DELAY- 2.5 - 4 sec.

This is a fairly standard looking coloured smoke grenade. The body is a cylindrical sheet metal tin 138mm long and 66 mm diameter. There are eight small emission holes in the top plate in two sections of four holes directly opposite each other. The holes are closed by a self-adhesive clear plastic ring that fits the top of the grenade. The igniter mechanism screws into the top of the grenade. A plastic strap is slipped over the safety lever keep the lever attached to the grenade to prevent foreign object damage when thrown from aircraft. The opposite end of the strap is held on by the striker mechanism. This grenade emits green smoke for a period of approximately 30 seconds. The striker mechanism is similar to the "Striker Mechanism No. 2" but has the adapter and mechanism holder made as one unit.

L64A1

The body is painted light green with black markings. Markings give the designation "GRENADE HAND SIG SMOKE GREEN L64A1", the manufacturers marking, lot number, date of manufacture and a grouping of three "C's" in the colour of smoke produced.

Grenade, Hand, Signal smoke, L65A1- As above but produces Orange smoke.
Grenade, Hand, Signal smoke, L66A1- As above but produces Red Smoke.
Grenade, Hand, Signal smoke, L67A1- As above but produces Blue Smoke.

Grenade, Hand, Signal Smoke, Green, L68A1

TYPE- Smoke, Signal
HEIGHT- 141 mm
DIAMETER- 66 mm
DELAY- 2.5 - 4 sec.

This is a coloured smoke grenade normally used for signaling purposes. It is manufactured by Haley & Weller for British Forces.

The body is made in a fairly standard form but is formed by stamping a closed cylinder of

L69A1

light sheet metal and attaching a bottom on the body by rolling and seaming. The top is formed by the stamping of the body. A central hole is made in the top and fitted with a plastic adapter. There is a single emission hole in the base of the grenade. A plastic igniter mechanism screws into the adapter. There is an inner liner contained within the body that is covered by small holes to allow the smoke to escape.

The igniter mechanism is made entirely of plastic, including the safety lever. The safety lever is held at the front by a moulded section that clips onto the body of the mechanism. A wire spring is fitted to the safety lever that bears on the front of the mechanism. When the safety pin is pulled and the grenade thrown, the striker pushes the safety lever out of the way so that it hinges forward but remains attached to the mechanism. The spring attached to the lever, forces the lever back into position after the striker has rotated fully forward and hit the primer. This arrangement ensures that the lever does not cause a danger from flying objects when thrown from a helicopter and the lever being forced back tightly to the body does not interfere with the aerodynamic qualities of the grenade, such as they are.

The body is painted light green with markings in black. The markings give the designation "GRENADE HAND SIG SMOKE GREEN L68A1", manufacturers marking, date of manufacture and lot number. Three "C's" are painted below the designation in the colour of smoke produced.

Grenade, Hand, Signal Smoke, Orange, L69A1- As above but produces orange smoke.
Grenade, Hand, Signal Smoke, Red, L70A1- As above but produces red smoke.
Grenade, Hand, Signal Smoke, Blue, L71A1- As above but produces blue smoke.

Grenade, Hand, Smoke Screening, Training, L72A1

TYPE- Smoke, Screening
WEIGHT- 450 g
LENGTH- 124 mm
DIAMETER- 68 mm
FUSE DELAY- 8 sec.

This is a smoke grenade particularly designed for use during training producing a low toxicity smoke for safety. This grenade is produced by British Aerospace Defence Ltd., Royal Ordnance Division, Chorley.

The main body is made of tinplate in the same manner as a tin can with a cylindrical centre section and two ends that are rolled and seamed onto it. An adapter mounted in the centre of the top cap is threaded to receive a plastic bodied igniter mechanism. The body is painted dark green with markings in light green. Markings give the designation "GRENADE HAND SMOKE SCREENING TRAINING L83A1", a lot number, manufacturers mark (H&W), and date of manufacture. The safety lever is of the type that remains attached to the grenade after throwing to prevent foreign object damage when used from helicopters. It will have a plastic lanyard attached from the body to the lever. There is an eight second delay element in the igniter mechanism. It then flashes down into a gunpowder starter mixture immediately igniting the main filling. There are six 1/8 inch emission holes equally spaced around the top of the grenade. The holes are sealed by a self adhesive aluminum foil washer pasted over the top of the grenade. When ignited, the grenade produces thick cloud of off white smoke forming an effective smoke screen in approximately 8 seconds. Smoke is emitted from the grenade for 40 to 80 seconds.

L72A1
Photo- Ray Ford

The main body of the grenade is painted dark green with markings in white giving the designation "GRENADE HAND SMOKE SCREENING TRAINING L72A1", the lot number and a manufacturers mark.

Grenade, 40 mm, HEAT, L74A1

This grenade is a French manufactured grenade that has been adopted for British service. It is designed and manufactured

TYPE- Anti-tank
WEIGHT- 390 g
DIAMETER- 40 mm
FILLING- RDX

by Luchaire Defense SA, Saint Cloud, France. The grenade is designed for use in CQB (Close Quarter Battle), FIBUA (Fighting in Built Up Areas), and against lightly armoured vehicles. This version has a primary role of anti armour.

The grenade consists of a tail assembly, light alloy body, and a plastic and steel nose assembly. The tail assembly consists of a light alloy tube with plastic fins attached to the bottom end. A steel block bullet trap and additional propelling charge is fitted into the top end of the tube. An F12 fuze consisting of an escapement assembly and firing pin assembly is fitted immediately in front of the bullet trap. A mechanical safety in the fuze ensures the grenade arms at a distance of 5-10 metres from the muzzle. The warhead contains a shaped charge of RDX with a copper lining, booster charge and a detonator. The nose assembly consists of a plastic cone fitted with a steel pawl. The nose assembly is designed to ensure the grenade gives reliable functioning at angles of incidence up to 70 degrees.

The grenade is painted olive drab and has a wide black band and thinner brown and yellow bands around the warhead. Markings in yellow give the designation "HEAT L74A1 5.56 mm/SA80", date of manufacture, lot number, and batch number.

When the grenade is fired, the bullet penetrates an internal bulkhead that prevents particles from blowing back into the firers face. It strikes the bullet trap, the main mass of the trap absorbing the impact. Hot gases from the bullet propellant ignite the additional propelling charge and the combined effects launch the grenade off the rifle. Gases formed by the propelling charge flow through two vents around the bullet trap and commence the arming process by pushing the firing pin safety sleeve forward. This bends four tabs around the firing pin housing. The forward movement of the sleeve unlocks the firing pin and pushes the rotor lock pin forward bending the safety pin retaining collar. These actions remove the mechanical lock on the rotor and allow it to turn under pressure of a spring. The firing pin safety sleeve reaches its forward position and is locked in place by two plastic locking lugs. At this point the firing pin is prevented from forward movement by an anti creep pin. The rotor movement is governed so that after 20 milliseconds the anti creep pin is allowed to move forward and unlock the firing pin. After another 260 milliseconds the rotor completes its movement and the fuze is armed. On impact, inertia causes the firing pin to move forward and strike the detonator initiating the main charge.

The grenade is capable of penetrating up to 80 mm of rolled homogeneous armour. The maximum sighted range is 125 metres but the grenade may be fired to ranges up to 400 metres. The grenade is fired from the SA80 rifle using a standard ball cartridge.

Grenade, 40 mm HEAT-APERS, L75A1

TYPE- Anti-tank / Anti-personnel
WEIGHT- 405 g
DIAMETER- 40 mm
FILLING- RDX

This grenade is another French manufactured grenade that has been adopted for British service. It is designed and manufactured by Luchaire Defense SA, Saint Cloud, France. The grenade is designed for use in CQB (Close Quarter Battle), FIBUA (Fighting in Built Up Areas), and against lightly armoured vehicles. This grenade has an anti armour role with a secondary anti personnel capability.

The grenade consists of a tail assembly, light alloy body, and a plastic and steel nose assembly. The tail assembly consists of a light alloy tube with plastic fins attached to the bottom end. A steel block bullet trap and additional propelling charge is fitted into the top end of the tube. An F12 fuze consisting of an escapement assembly and firing pin assembly is fitted immediately in front of the bullet trap. The warhead contains a shaped charge of RDX with a copper lining, a main charge of RDX surrounded by fragmentation rings, a booster charge, and a detonator. The nose assembly consists of a plastic cone fitted with a steel pawl. The nose assembly is designed to ensure the grenade gives reliable functioning at angles of incidence up to 70 degrees.

The grenade is painted olive drab and has a wide brown band and thinner black band around the warhead. Markings in yellow give the designation "HEAT-APERS L75A1 5.56 mm/SA80", date of manufacture, lot number, and batch number.

The grenade is capable of penetrating up to 80 mm of rolled homogeneous armour and has a lethal anti personnel radius of 15 metres. The maximum sighted range is 125 metres but the grenade may be fired to ranges up to 400 metres. The grenade is fired from the SA80 rifle using a standard ball cartridge. The mechanical safety in the fuze arms the grenade at a distance of 5-10 metres from the muzzle. The action on firing is exactly the same as the L74A1.

Grenade, Hand, Screening Smoke, Training, L83A1

TYPE-Smoke, Screening
LENGTH- 141 mm
DIAMETER- 66 mm
DELAY- 8 sec.

The grenade is made by Haley & Weller. It is designed for use during training and utilizes a non-toxic smoke composition. It was likely designed to replace the L72A1 as a less expensive alternative.

The body is made in a fairly standard form but is formed by stamping a closed cylinder of light sheet metal and attaching a bottom on the body by rolling and seaming. The stamping of the body forms the top. A central hole is made in the top and fitted with a plastic adapter. There is a single emission hole in the base of the grenade. A plastic igniter mechanism screws into the adapter. An inner liner formed from plastic is contained within the outer casing and contains the main smoke producing composition.

The igniter mechanism is made entirely of plastic, including the safety lever. The safety lever is held at the front by a moulded section that clips onto the body of the mechanism. A wire spring is fitted to the safety lever that bears on the front of the mechanism. When the safety pin is pulled and the grenade thrown, the striker pushes the safety lever out of the way so that it hinges forward but remains attached to the mechanism. The spring attached to the lever, forces the lever back into position after the striker has rotated fully forward and hit the primer. This arrangement ensures that the lever does not cause a danger from flying objects when thrown from a helicopter and the lever being forced back tightly to the body does not interfere with the aerodynamic qualities of the grenade, such as they are.

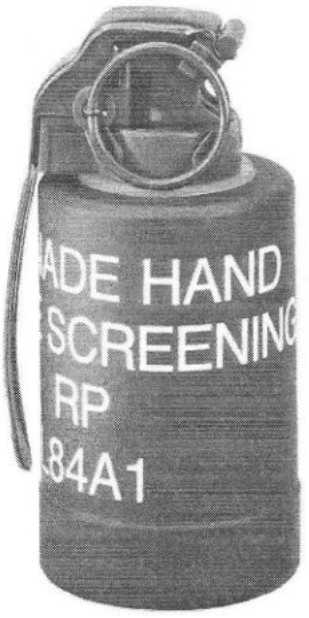
The body is painted dark green with markings in light green. Markings give the designation "GRENADE HAND SMOKE SCREENING TRAINING L83A1", a lot number, manufacturers mark (H&W), and date of manufacture.

When ignited, the grenade produces a thick cloud of off white smoke for a period of 40-80 seconds.

Grenade, Hand, Smoke Screening, RP, L84A1

TYPE- Smoke, Screening
WEIGHT- 380 g
HEIGHT- 132 mm
DIAMETER- 62 mm
DELAY- 3-4 sec.

This is an operational grenade currently in use with British Forces as a replacement for the No. 80. It is designed and manufactured by Buck Technologies in Germany. It is designed to be a rapid action smoke grenade that provides a quick and effective smoke screen and have a secondary incendiary use. As such, this smoke grenade will generate an effective smoke screen within one second of ignition. The smoke produced is also effective in the infrared spectrum.



L84A1

The body is constructed of extruded aluminum open at the bottom. The top of the body is fitted with an adapter that the igniter mechanism screws onto. The bottom is closed by a cap after filling. The plastic striker mechanism is a fairly standard percussion type utilizing a spring loaded striker held in the cocked position by a safety lever. A percussion igniter is fitted into the striker mechanism. The safety pin clips into three plastic lugs on the fuze body to prevent accidental removal. The burster is contained in an aluminum tube that fits into the adapter and is held in place by the striker mechanism. It contains the bursting charge and a 3 - 4 second delay element. The striker mechanism is screwed down onto a plastic washer that forms a watertight seal.

The filling consists of many "washers", which may be paper or plastic, coated with a pyrotechnic mixture with the main ingredient of red phosphorous. As many as possible

are loaded into the body. The "washers", when loaded form a central channel for the burster that runs almost to the bottom of the grenade. After filling the grenade is closed by an aluminum cap cemented in place to form a watertight seal.

When the grenade is thrown, the striker is free to rotate on its axis pin throwing the safety lever off as it rotates. The striker hits the percussion igniter that flashes into the delay element. The delay element burns for 3.5 seconds, plus or minus 0.5 seconds and fires the bursting charge. The bursting charge causes the body to burst along the shear lines that are machined on the inside of the body, ignites the pyrotechnic mixture, and scatters the filling over an area of about 20 metres. A dense, white, smoke screen forms quickly and will last for 30 to 120 seconds before dissipating. Fragments of the body may be thrown up to 30 metres.

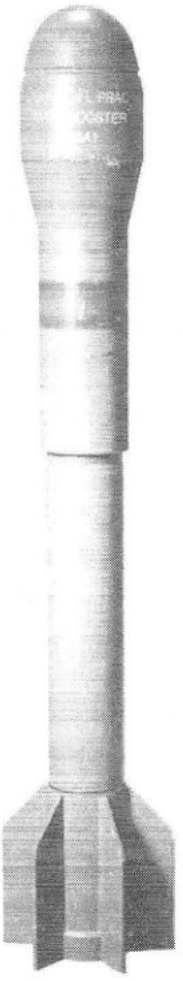
The grenade is painted a deep bronze green with markings in light green. Markings give the designation "GRENADE HAND SMOKE SCREENING RP L84A1, lot number, manufacturer, and date of manufacture.

Grenade, Rifle, HE, Anti-Personnel, L85A1

TYPE- Fragmentation
WEIGHT- 488 g
LENGTH- 320 mm
DIAMETER- 41 mm
IGNITER- Impact
FILLING- 60 g

This is an anti personnel rifle grenade that has been adopted by the British. It is an Israeli BT/AP-M1091 rifle grenade marked for British use as an L85. It is one of the TAAS bullet trap rifle grenades manufactured by TAAS- Israel Industries Ltd. It is issued to enhance the combat capabilities of the infantryman. It is very effective in CQB (close quarter battle), FIBUA (Fighting in built up areas), or against lightly armoured vehicles.

It has a pre-fragmented steel warhead filled with an 60 gram shaped charge of RDX. The tail assembly is a light alloy tube with fixed plastic fins. A steel block bullet trap assembly is fitted and staked to the top end of the tail assembly. There are three steel plates in front of the bullet trap that aid in retaining the bullet and an angled bullet deflector fitted in front of the steel plates that will deflect any bullet that penetrates the bullet trap away from the fuze and main charge. The booster, or propelling charge is located immediately in front of the bullet trap. The fuze is located immediately forward of the bullet trap assembly. It has a mechanical impact fuze with arming safety. The grenades are each supplied with a disposable plastic sight.



L86A1

The grenade is painted deep bronze green with markings in yellow. A brown band indicates the presence of the low explosive booster. Markings include the designation "GREN RFL HE APERS L85A1", lot number, date, and a manufacturers mark.

In the unarmed state, the rotor containing the detonator is out of line with the striker. The rotor is prevented from moving by a rotor lock pin and rotor movement is blocked by the striker pin. The two pins are held forward against springs by two arming balls that are held in position by the head of an arming pin. The arming pin is in contact with the forward end of the bullet trap and is secured by a shear pin. On firing, the bullet strikes the bullet trap and forces it forward, this shears the pin holding the arming pin off. The arming pin moves forward allowing the two balls to move out of position into a recess. This allows the striker pin to move back under pressure of its spring unblocking the rotor. At this point the rotor locking pin is still retained in position by a leaf spring. The gases generated by the firing round ignite the booster charge, the gases formed by the booster charge escape rearward through six ports assisting in the launch of the grenade. The setback caused by the booster charge overcomes the leaf spring and allows the rotor locking pin to move rearward out of position freeing the rotor. The rotor is now free to rotate into position. The speed of rotation is governed so that it will not move into the armed position until the grenade has travelled 18 metres. Once it reaches the armed position it locks into position. On impact, the striker pin overcomes its spring and strikes the detonator which fires initiating a lead charge and in turn the main charge.

The grenade has a lethal radius of 5 metres on detonation. While not designed as an anti armour weapon, the shaped charge warhead will penetrate 15 mm of rolled homogeneous armour plate. The maximum sighted range is 150 metres but the grenade may be fired to a maximum range of 300 metres.

Grenade, Rifle, Practice, with Booster, L86A1

TYPE- Practice
WEIGHT- 465 g
LENGTH- 320 mm
DIAMETER- 41 mm

This is a practice rifle grenade made in Israel by TAAS- Israel Industries Ltd. and adopted by the British Forces. It is in fact an M1092 grenade marked for British use as L86. It is used for field firing practice representing the L85 anti personnel rifle grenade.

The grenade is virtually identical in size and shape to the live L85A1. It is a single use disposable practice grenade. The warhead is solid aluminum fitted onto a monobloc portion representing the fuze section. The tail assembly is identical to that used on the L85A1. It is a light alloy tube with fixed plastic fins. A steel block bullet trap is fitted and staked to the top end . There are three steel plates in front of the bullet trap that aid in retaining the bullet and an angled bullet deflector fitted in front of the steel plates that will deflect any bullet that penetrates the bullet trap away from the head. The booster, or propelling charge is located immediately in front of the bullet trap.

The grenade is painted light blue with a brown band around the stem of the head indicating the presence of a live component, in this case the low explosive booster assembly. The head is marked in white with the designation "GREN RFL PRAC WITH BOOSTER L86A1". Also present are the manufacturers marking "IMI" and the lot number which incorporates the month and year of manufacture.

The grenade is fired from the service rifle (SA80), the flash from the launching cartridge igniting the booster giving the grenade a longer range than would normally be possible. The maximum sighted range is 150 metres but the grenade can be fired to ranges up to 300 metres.

Grenade, Rifle Launched, Practice, Inert, L87A1

TYPE- Practice
WEIGHT- 467 g
LENGTH- 320 mm
DIAMETER- 41 mm

This is part of a kit designated " The Grenade, Rifle, Training Kit, RGGS L87A1". As there are no live components, these grenades can be used for classroom training as well as firing practice.

The main body consists of the solid aluminum warhead attached to a monobloc body representing the fuze portion of the grenade. The tail tube assembly consists of a number of replaceable parts, a tail tube, fin assembly, sleeve washer, protective sleeve, and retention nut. The grenade is not fitted with a bullet trap and is only fired using the L1A1 ballistite cartridge. At the front end of the tail tube is a round plate that acts as an emergency bullet trap in case the grenade is accidentally fired using a live cartridge.

The main body of the grenade is painted light blue with markings in white. The tail tube and fins are white to aid in location and recovery after firing. Markings on the head give the designation "GREN RFL PRAC L87A1", the manufacturer, date and lot number.

The kit is packed in a wooden box and comes with 6 grenades, 30 fin assemblies, 24 tail tubes, 25 sleeve washers, 18 protective sleeves, 18 retention nuts, 2 assembly tools, and 1 broken tail tube extractor. Early issues of the grenade were packed in boxes labeled "6 Practice Grenade, Rifle IMI Training Kit M109".

Damaged components are changed by unscrewing the retention nut and sliding off the fin assembly, sleeve washer, and protective sleeve. If the tail tube requires replacement the rubber washer and round plate must be transferred to the new tube or the grenade will not function correctly.

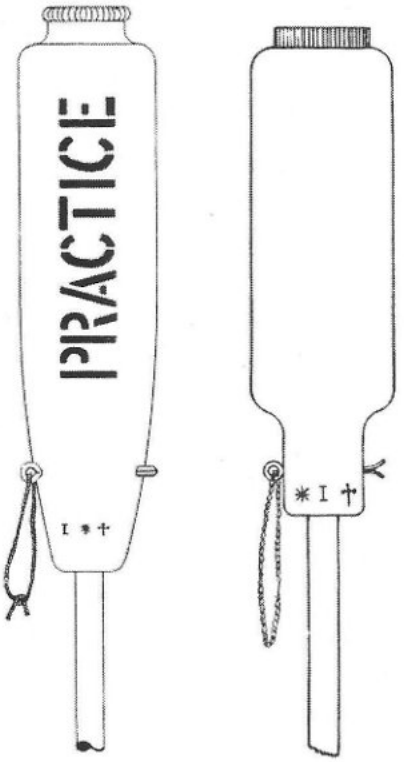
Grenade, .303 inch Rifle, Practice, Nos. 3, 3A and 20, Mk. I [L]

This practice rifle grenade was used to represent the No. 3, No. 3A, or No. 20 grenade. It could also be used for instructional lessons in priming of the grenades.

The body is cast iron made in a cylindrical shape with the base tapering down towards the closed rear end. A 10 inch, Mk. I, rifle rod is screwed into a threaded hole in the base. A metal plug representing the detonator closes a threaded hole in the front end. A split pin representing the safety pin, passes through the body near the rear end.

For instructional use, a "Detonator, Rifle, Grenades, Practice, Mk. I" could be used in place of the metal plug. The detonator is made of metal in the same outline as the "Detonator, Rifle grenade, Mk. I or II. Two large holes are bored through the tubular portion to identify it as a drill detonator. In addition it is marked "DUMMY".

The grenade is painted white and has the word "PRACTICE" stenciled on the side. The white colour not only identifies it as a drill grenade but also helps locate them after firing. The Mark, manufacturers mark, and date of manufacture are cast into the bottom of the body.



Left - Grenade, Practice, Nos. 3, 3A, and 20, Mk. I

Right - Grenade, Practice, Nos 24, 35, and 39, Mk. I

Grenade, .303 inch Rifle, Practice, Nos. 24, 35, and 39, Mk. I

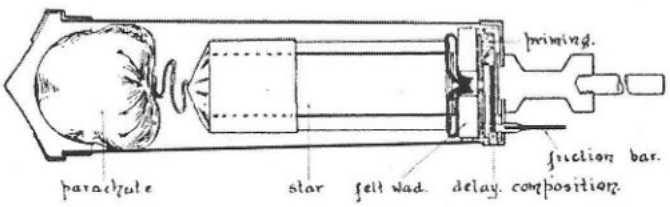
This grenade was used to represent the No. 24, No. 35, or No. 39 grenade for firing practice.

The body is made of cast iron in a shape that closely resembles those grenades. A launching rod is screwed into the bottom. The top end has a metal plug to represent the detonator assembly. A split pin representing the safety pin passes through the socket for the rod.

The grenade is painted white to identify it as a practice grenade and as an aid to recovering fired grenades. The Mark, date of manufacture, and manufacturers marking are cast into the base of the grenade on the socket for the launching rod.

Grenade, Illuminating, Short Rifle, Mk. I [C]

This illumination grenade was used during the First World War, it was in service as early as 1915 but it is unclear as to when it was taken out of service.



Grenade, Illluminating, Short Rifle, Mk. I

The main body of the grenade is a slightly conical tin casing. The base of the casing is attached to a socket to hold the "Rod, .303 in. Short Rifle, Illuminating Grenade, 15 inch, Mark I" and a spring clip to grip the nose cap of the rifle. A friction bar is fitted to the base of the grenade leading to a delay element. The delay element leads to the expelling charge. The expelling charge is covered by a felt wad that has a hole in the middle. The illuminating star fits on top of the felt wad with strands of quickmatch leading through the hole in the felt wad down to the expelling charge. A parachute is attached to the top end of the star. The grenade is closed at the top end by a conical wooden cap hollowed out to fit the rolled up parachute.

For use, insert the rod into the barrel of the rifle and push down until the spring clip engages the nose cap of the rifle.

Attach the friction bar to the rifle by a small chain. Load the rifle with a launching cartridge and fire. When the grenade is propelled off the rifle, the chain pulls the friction bar out of the friction igniter that lights the delay element. The delay element provides a delay sufficient for the grenade to reach the designed height then ignites the expelling charge. The expelling charge fires igniting the quickmatch which in turn ignites the illumination star. At the same time the expelling charge forces the star and parachute out the top end of the grenade where it ignites and provides illumination of the battlefield.

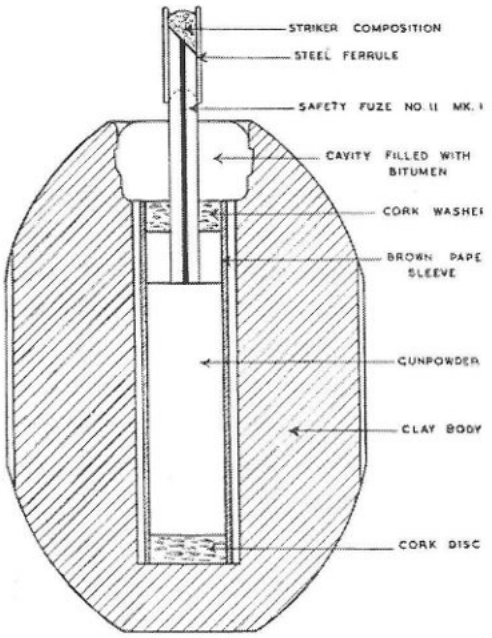
Grenade, Hand, Clay, Mk. I

TYPE- Practice
LENGTH- 102 mm
DIAMETER- 70 mm
IGNITER- Match head
FUSE DELAY- 5 sec.
FILLING- 11.5 g

This is a training grenade similar in shape to the No. 36m Mk. I grenade. It is designed to simulate the action of a bursting grenade. The grenade was used during the Second World War, the formal date of introduction is 6 July 1942.

The body is basically oval in shape with sixteen longitudinal grooves on the straight sides of the grenade to provide a firm gripping surface. The grooves are about 1/16" deep and 1/8" wide. The body, made of clay, is drilled from the top to within 1/2 inch of the bottom.

There is a bursting charge consisting of a rolled paper sleeve filled with 11.5 grams of G12 gunpowder. The ends of the tube are closed by cork discs. The bursting charge is ignited by a 2-inch length of No. 11 Mk. 2 safety fuze that passes through the cork disc into the main powder charge. A steel or copper ferrule is crimped onto the exposed end of the fuze and has the open end filled with match head composition. After filling, the entire burster is waxed and the exterior of the fuze shellac varnished. After the bursting charge is inserted in the body cavity, the open top is filled with bitumen to provide a waterproof seal.



Grenade, Hand, Clay Mk. I

The body is painted white with a .25 inch red filling ring painted around the top. The designation is stenciled in black around the top portion of the body. The manufacturers mark and date of manufacture are stenciled on the bottom portion.

For use, the match head composition is struck with a brassard and the grenade immediately thrown. The compound ignites the safety fuze that burns for 5 seconds. After the delay the fuze flashes from the bottom end into the gunpowder filling which then ignites. The grenade gives a sharp bang and puff of smoke. A reasonable safety distance must be maintained due to the danger of lumps of hard clay being projected from the body.

General Purpose Grenade

This grenade was produced during the Second World War for SOE. It was designed by Experimental Station 6 (War Department) in late 1944 for use by SOE/OSS operatives. It is a combined concussion grenade and demolition charge.

The body is a rectangular tin plate box folded and soldered together. On one end is an igniter well roll threaded to accept a standard No. 247 Mk. 3 fuze. Inside the body, below the igniter well is a central tube containing the detonator surrounded by two CE pellets that are then surrounded by the main charge.

The grenade is totally black with no markings whatever. The

GP Grenades fitted with a selection of different fuzes.
Photo- Norman Bonney

lack of markings is deliberate for SOE material to make it untraceable or at least difficult to trace. If fitted with the No. 247 fuze mechanism the fuze mechanism may be marked as normal.

It can be configured in several ways, with a No. 247 fuze mechanism it is used as a grenade. If fitted with a time pencil it becomes a small demolition charge. The third fuze (centre of photo) is a sympathetic fuze that works on an imploding diaphragm principle. Several GP grenades fitted with these fuzes can be set around a timed charge, when the blast wave from the timed charge reaches the fuze it will detonate the grenade. It could also be combined with others to make a larger demolition charge or threaded onto detonating cord to become a necklace.

Bomb, Incendiary, 1 1/4 lb. Mk. 1

TYPE- Incendiary
WEIGHT- 567 g
HEIGHT- 173 mm w/o cap
115 mm body only
DIAMETER- 53 mm
FUZE DELAY- 5 sec.
FILLING- 500 g

Originally designated "Grenade, Incendiary" by its designers the service designation was changed upon adoption. This is an incendiary device specifically designed to destroy equipment. This device was in use during the Second World War, actual dates of introduction and obsolescence are not known at this time.

Bomb, Incendiary, 1 1/4 Lb. Mk. 1
Left- 1940 version
Right- After summer of 1941
Photo - Norman Bonney

The body is a cylindrical tin plate body with top and bottom attached with folded seams. The top has a neck, screw threaded externally. The body is filled with an incendiary mixture of Thermite with a depression formed in the top, just below the threaded neck. A paper cup ensures the depression does not collapse. A bakelite fuze mechanism screws onto the threaded neck. The fuze mechanism consists of a bakelite adapter and safety cover, zinc alloy cap chamber, cup securing cap chamber, safety fuze, and percussion cap. The fuze assembly has the percussion cap attached to the fuze and the whole thing then inserted in the cap chamber. A length of copper tube is then placed over the fuze and secured by crimping. The igniter unit consists of a tin plate cup filled with ignition compound and topped with a primed cambric disc.

The igniter assembly is inserted in the top of the body extending down into the depression in the filling. The bakelite adapter screws onto the neck of the body holding the igniter assembly in position. The fuze assembly fits in the top of the adapter and is secured in position by the "cup securing cap chamber" that fits over the top allowing the top of the cap chamber with the percussion cap to protrude. The safety cap screws onto the adapter with a rubber washer under it to make a watertight seal. A strip of adhesive tape secures the safety cap onto the adapter preventing accidental removal.

Originally in 1940, the body was painted buff with black markings. Markings included the designation, date, manufacturer, and instructions for use. The instructions read ; "INSTRUCTIONS FOR USE. STAND BOMB ON BASE, REMOVE TAPE AND SAFETY COVER AND STRIKE CAP. DO NOT TOUCH AFTER FIRING". In the summer of 1941 a new marking scheme was introduced. The body is painted buff with black markings. A red filling ring is painted around the lower portion of the body. Markings give the designation" BOMB INCENDIARY 1 1/4 LB MARK. 1 ", instructions for use, manufacturers mark, fillers initials, filling date, and delay time. The instructions for use read: "INSTRUCTIONS FOR USE. REMOVE TAPE AND SAFETY COVER, AND STRIKE CAP A SLANTING BLOW ON A HARD SURFACE. THROW OR PLACE IMMEDIATELY WHERE REQUIRED. THERE IS A 5 SECOND DELAY."

For use, the bomb is best employed by being placed in position with its base on the object to be destroyed. Remove the adhesive tape and unscrew the safety cover. When the percussion cap is struck with a hard object the cap fires and lights the safety fuze. The safety fuze burns for 5 seconds before igniting the igniter assembly. The burning igniter assembly starts the main filling of Thermite. Thermite burns at temperatures up to 5000 degrees and will destroy almost any metal object it is in contact with.

Kit, Rifle Grenade, Practice, L60A1

Monobloc body of the L60A1

There is a practice rifle grenade marked "GREN RFL 40mm TP MARKER L60A1". At first glance one would assume that this was the L60A1 grenade. This is not the case, these grenades are part of a kit designated "Kit, Rifle Grenade, Practice, L60A1". The kit is French designed and purchased from Luchaire Defense SA, Saint Cloud, France. A US patent, 5257936, dated 2 November 1993 was issued for this grenade. British and French patents are not known.

The grenade itself consists of a monobloc body with a slightly larger portion turned at the top end and a hollow tail tube at the bottom. The enlarged portion closes the top of the tube and has two grooves turned into it. The forward groove is fitted with a rubber "O" ring. A set of plastic fins is mounted on the bottom end. There are eight fins that are slightly angled to give a slight spin to the grenade in flight to increase accuracy. A plastic marking head filled with a marking powder fits onto the enlarged portion of the grenade. The marking head is strong enough to withstand the shock of firing but will break apart even when the grenade lands at a slight angle. The head fits over the enlarged portion of the tube assembly and is retained in place by the "O" ring.

The kit is packed in a polystyrene container and contains, one monobloc body with fins, ten plastic heads, ten ballistite cartridges and two plastic sights.

The metal portions of the grenade are finished in a dark blue and have white markings. The fins and the head are made of olive green plastic. Markings give the designation "GREN RFL 40 mm TP MARKER L60A1", manufacturers mark, date of manufacture and lot number.

When the grenade is fired and strikes the target, the head breaks apart and marks the location of the strike. The tail portion can then be recovered and fitted with a new head and used again. These grenades are not fitted with bullet traps and must be fired with special launching cartridges. Prior to reuse, the tail assembly must be inspected to ensure there is no damage that could cause a safety problem such as cracks in the tube.

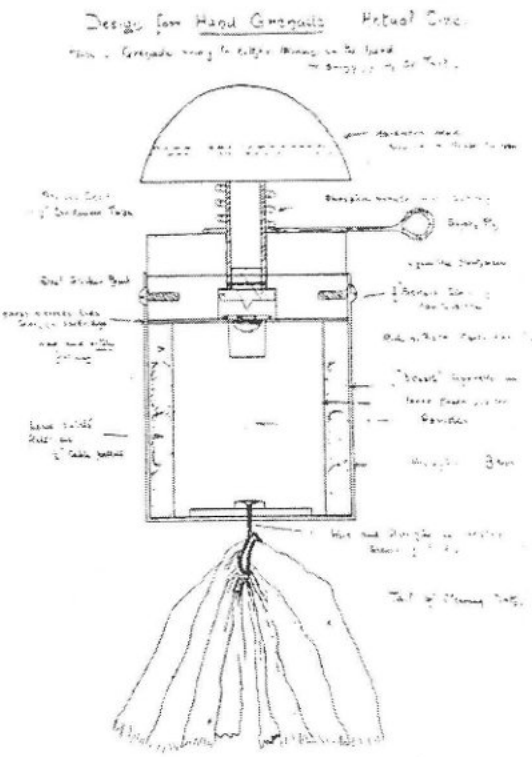
Australian Grenades

Australian grenade production prior to the Second World War was negligible. They had produced a number of grenades during the First World War; mostly improvised types made for the operations in Gallipoli but also some very innovative designs that were not adopted for varying reasons.

At Gallipoli there was initially a severe shortage of grenades. The Australians were up to the task and manufactured thousands of "jam tin bombs" and other improvised grenades on the beaches providing the troops with a sufficient quantity of grenades for use in operations. These grenades took the same form as the ones manufactured in the trenches of France.

In an attempt to help the situation, the Senior Naval Officer at Mudros Port on Lemnos, sent a message to the ships under his command requesting designs and samples of grenades for evaluation. Four designs were submitted, two from H.M.S. Prince George, one from H.M.S. Chatham, and one from H.M.S. Cornwallis. These grenades and design drawings were sent to Lt. Col. G.R. Pridham, Royal Engineers. As the Divisional Engineer at ANZAC cove he appraised the designs and replied on 3 July 1915. His reply notes that the percussion grenades have not had a good history but the fuzed bombs are of good design. However, they are currently using and making bombs of a similar pattern already. With this, the fate of the grenades designed on the ships was sealed; they would not be produced. The designs were rather interesting though.

The **H.M.S. Prince George No. 1** is a double cylinder cigarette tin grenade with a percussion type igniter mechanism. The outer cigarette tin acts as the grenade casing, an inner tin; smaller in size contains the explosive charge that may be either gunpowder or a guncotton primer (a detonator must be used if guncotton is used). The space between the inner tin and outer tin is filled with shrapnel balls or other fragments. The inner tin is then sealed by a brass disc that has a recess in the centre to take a revolver cartridge with the bullet removed. The opposite end of the inner tin is sealed with a wooden plug and tin disc. The inner tin is held in place by a safety pin fitting through the outer tin. The other end of the outer tin is closed by a brass disc with a striker mounted in the centre. The opposite end has a metal eye to attach a cloth tail. This ensures the grenade will land headfirst. When the safety pin is removed and the grenade thrown, the cloth tail creates drag causing the grenade to fly headfirst. When it hits the ground, the inner tin is thrown forward; the primer hits the striker and fires, which causes the filling to explode.



Original drawing of the HMS Cornwallis Grenade
AWM27-505/18

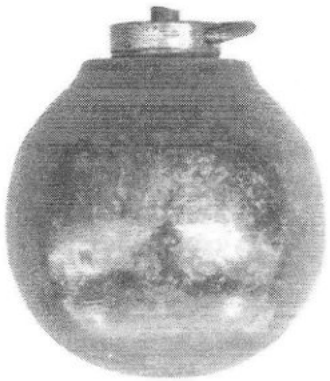
The **H.M.S. Prince George No. 2** is also a double cylinder cigarette tin grenade but has time fuze ignition. In this case, the outer tin is closed by a wooden bung with the inner charge container secured to it. The space between the inner container and outer container is filled with shrapnel balls or other fragments. The wooden bung is made in two parts and has a horizontal passage bored into it. The outer end of the passage is bored to take a "Bickfords pistol pattern" cartridge. The inner end connects to a vertical passage into the charge container. A gas escape vent is bored from the top to the horizontal passage. A length of safety fuze is laid into the passage to provide the time delay. The igniter is formed of a brass bushing with a steel striker mounted in it. A safety pin and light shear wire passes through the bushing

and striker. To fire the grenade, remove the safety pin and give the striker a sharp blow. This cuts the shear wire and drives the striker into the primer, the primer fires and ignites the safety fuze that burns down and ignites the filling.

The **H.M.S. Chatham** grenade was simply a soda bottle filled with L.G. 2 powder and a 6-inch piece of safety fuze. The bottle is sealed by filling the neck with cotton waste, then a layer of candle grease and finally a layer of sealing wax. The fuze protrudes out the neck of the bottle. The top of the fuze has three safety matches secured around it. These are covered by a .455 Webley cartridge casing with a coating of amorphous phosphorous (like the striking surface off a matchbox). A pin is pushed through the fuze and has a piece of tape attached. For use, pull the pin out, remove the cap (cartridge case) and draw the cap across the match heads. The match heads ignite and light the fuze. Watch the hole where the pin was inserted, when smoke comes out, the grenade will explode 7 seconds later.

The **H.M.S. Cornwallis grenade** is the only one of the four samples to have survived. The only example of this grenade currently resides in the "Australian War Memorial" collection. The outer casing is again a cigarette tin with an inner container to contain the charge. The space between the inner and outer containers is filled with lead bullets secured in wax. The tin is closed by a wooden (lignum vitae) plug that forms the bearing and guide for the striker. The striker is made of an elm mushroom cap mounted on a striker made from 1/2-inch condenser tube that has a steel striker driven and pinned into the end. The fuse consists of the cap of a pistol or rifle blank cut down and mounted onto a bronze disc on top of the charge container. The other end has a tail made of rags to ensure the grenade lands headfirst.

The **Malta grenade** is similar to the British No. 15 grenade but was produced in Malta in 1915 on the orders of the Commander of the Mediterranean Expeditionary Force; Sir Ian Hamilton. It was a cast iron ball with a brass closing plug in the top and a piece of safety fuze sticking out through the plug. Although it appears primitive the Malta grenade was much preferred by the troops over the numerous improvised grenades made on the beaches. It could be filled with almost any explosive; the only difference being the use of a detonator if filled with high explosive. Markings that may be found cast into the body are "MALTA" and the year of manufacture "1915".



Malta Grenade

The **Lotbiniere** grenade was again similar to the Hairbrush type being made in the trenches of France. The Australians named it after Maj. Gen. A.C. de L. Jolly de Lotbiniere, Chief Engineer of ANZAC Corps. It simply consisted of a wooden handle with a tin of explosive attached and fitted with a time fuze. There were no provisions made for fragmentation but it did have a good blast effect.

In addition to the grenades listed above, the Australians produced and trialed a number of grenades which were not accepted for use. One interesting item was the **Russell-Sutton Grenade**. Designed by a professional engineer, Mr. G.V. Russell, this grenade was submitted to the Federal Munitions Committee in August 1915. The New Zealand Minister of Defence also showed interest in the grenade. This grenade was subjected to exhaustive trials but was finally refused on 6 January 1916. Basically the grenade consisted of a sheet metal boomerang containing 3 ounces of blasting gelatin at the bend of the boomerang. The charge was to be set off by a detonator and short length of Bickfords fuze. The fuze was ignited by a match head on the end of the fuze.

After the First World War, the Australians, as was the practice in most Commonwealth countries, used British designed grenades exclusively. These grenades were all manufactured in the U.K. and shipped to Australia. In about 1940, when supplies from the U.K. could not be assured, the Australians contracted with a number of private firms to produce Australian copies of the British grenades. The grenades produced included the No. 36M Mk. I, No. 58 Mk. I, No. 63 Mk. I, No. 68 Mk. III, No. 69 Mk. I, No. 75 Mk. II, and No. 77 Mk. I. These grenades were made to the same specifications as the British grenades and can only be identified by the manufacturers markings. Australian production supplied not only the Australian forces but was also shipped to the U.K., New Zealand, India, South Africa, and the Dutch East Indies. Grenades were also supplied to the American Forces in the Pacific. A survey done of American troops after the Sanananda Battle of the Papuan Campaign showed that 78.6% preferred the Australian grenades (No. 36M Mk. I) to their own Mk. II grenade. There is also evidence in the way of photos of the Australian use of the American M9A1 anti-tank rifle grenade. These were fired from SMLE No. 1 rifles with an attached spigot launcher designed specifically for the No. 1 rifle.

During the Second World War, Australia used the No. 36M grenade in some innovative ways. For use against bunkers the 36 was adapted by attaching two grenades together at the base plug relying on the blast propagation from one grenade to function the other. While not officially approved, these devices are known to have been used in the New Guinea Campaign and in training in the Atherton Tablelands (Ravenshoe), Australia.

They also developed two "Blast Bombs" for attachment to the No. 36. These were the "Blast Attachment (Aust) Mk. I" and the "Blast Bomb Mk. II". These were developed mainly to increase the blast effects of the grenades for use against Japanese bunkers. The Mk. I was of fairly simple construction, basically a tin of TNT with the baseplug of a No. 36 grenade rivetted to the cap. The grenade was then simply screwed onto the baseplug. It is unsure if the baseplug was modified so the detonator of the grenade passed through the plug into the blast bomb or it simply relied on the blast propagation of the grenade to detonate the explosive in the attachement. The Mk. II version improved on the Mk I by being larger and having the detonator of the grenade pass through the plug into a CE primer in the top of the bomb. Filling of the Mk. II was Ammonal.

After the war, Australia retained the British designs but continued to produce them in Australia. Production was taken over by Government factories, the main one being at St. Mary's. The No. 36M Mk. I remaining in service into the 1960's. By this time some of the grenades had been discontinued and other grenades taken into service, the No. 80 and No. 83 being two of them.

Blast Attachment (Aust) Mk. I
Photo - Robert Morgan

When the Australians got involved in Vietnam they began to adopt some of the American designed grenades. Throughout the Vietnam War the Australians used a mix of US and Australian manufactured grenades. The M26A1 grenade was adopted and used in Vietnam as well as the No. 80, No. 83 Mk. II, and No. 83 Mk. III. Australian forces also adopted the M34 WP and Mk.3A2 grenades during the Vietnam War. In addition to hand grenades the M79 grenade launcher with the M406 HE and M407 Practice 40mm grenades was adopted. It can reasonably be assumed that the Australians also had access to many of the other 40mm rounds for the M79.

The US designed M26A1 and M34 grenades were then produced in Australia for the Australian Defence Forces at St Mary's. The M26A1 has gone through changes to the fuze well to accommodate the M215 fuze mechanism thus becoming the M26A2. The M26A2 remained the standard fragmentation grenade until September 1999. The M26A2 is still found in service but is being replaced by an Australian designed grenade.

The facilities at St. Mary's produced smoke and gas grenades as well as military pyrotechnics such as thunderflashes. These items were made under the trade name "SMAREX" an acronym meaning St. Mary's Explosives. The latest Australian coloured smoke grenade, F2A1, was produced at the SMAREX facilities. The name SMAREX is only applied to the smoke grenades and thunderflashes, not to any other ordnance produced at the facility.

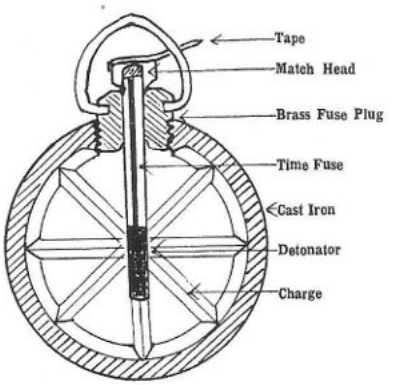
Recently Australia adopted a new series of grenades designed by ADI (Australian Defence Industries Ltd.). The series includes fragmentation, offensive, practice, coloured smoke, WP, white screening smoke, incendiary, and illumination grenades. To date the only grenades of the series adopted for use are the F1 Fragmentation and the F3 practice grenades. The F3 practice should not be confused with the F3 Dummy grenade.

In May of 1989 the Australian Government privatized all of the defence factories including St. Mary's. The Company became "Australian Defence Industries" with 51% of the shares being held by the government. In 1994 all ammunition production was moved to a factory in Victoria and the facilities at St. Mary's closed down. ADI remains the main ammunition supplier to the Australian Defence forces but has apparently now been sold to a French Arms Company, "Transfield".

"Law-Adams" Grenade

TYPE- Fragmentation
WEIGHT- 1 lb. 4 oz.
DIAMETER- 2.75 in.
IGNITER- Fuse or Brock Lighter

This grenade is very similar to the "Malta" grenade. It was designed by Major R. Law and Captain W.E Adams and submitted to the Department of Defense on 9 October 1915. One hundred grenades were then ordered as a test batch. Major Law, acting as the "Officer for Training Grenadiers" tested his own grenade and reported on the successful testing on 30 November 1915. Major Law then offered the grenade to the Commonwealth Forces free of cost. The Department of Defense recommended adoption of the grenade in a paper dated 16 December 1915, accordingly 2000 grenades were ordered for instructional purposes. Since Gallipoli was evacuated on 18 December 1915 and the Mills bomb was being delivered to Commonwealth forces in France by early 1916, the "Law Adams" did not see front line service.



Law- Adams Grenade

It is a cast iron ball, 2.75 inches diameter with a threaded hole in the top. The main difference between the "Malta" and "Law-Adams" is the internal segmentation of the "Law-Adams". The interior of the body is segmented so as to cause the body to break up into large, triangular, sharp pointed and edged fragments. Any form of explosive could be used whether a high explosive or low explosive. When used with high explosive a detonator must be fitted. A brass or gunmetal fuse plug with carrying ring closes the grenade after filling. The safety fuse fits in a hole through the center of the plug. Alternatively, a "Brock Lighter" could be used and was the preferred igniter.

"Welsh-Berry" Grenade

TYPE- Fragmentation
LENGTH- 2.5 in.
DIAMETER- 2 in.

The Welsh Berry grenade is nothing more than an improved Jam Pot grenade that was made under more stringent control in a facility that could provide better control and thus provide a grenade of greater reliability. It was made specifically for the forces under siege at Gallipoli.

The grenade consists of an outer tin resembling a Jam tin. Contained within the outer tin, is a smaller inner tin lined with cardboard. The inner tin contains the explosive charge. The space between the inner and outer tins is filled with small pieces of iron to provide fragments. A layer of pitch over the fragments holds them and the inner tin centred in place. The lid closes the grenade and holds two flanged iron fittings. The bottom fitting which ends up inside the grenade has a hole through the centre for the fuze. The outer fitting also has a hole through the centre for the fuze and an inner flange for the percussion cap. The large flanges on the outside of the fittings provide reinforcement and stability to the lid. The safety fuze with detonator attached, fit through the fittings extending down into the central tin and explosive charge. A percussion cap mounted at the top of the outer fitting provides a method to ignite the grenade. The outer fitting is then covered by a tin cap

The grenade is marked only by a pasted label giving the designation and instructions for use. The label reads as follows: *"Welsh Berry" "Instructions, Keep the safety clip which protects the percussion cap on the fuze plug until you are ready to throw the grenade. To fire, hold the grenade in the throwing hand. Give the percussion cap a sharp blow against a hard surface and throw at once. The grenade will explode between 4 1/2 and 5 seconds after the percussion cap is struck". "Advance Australia".*

Grenade, Hand, Fragmentation, M26

Initially when Australian forces adopted the M26 style of grenade it was the American M26A1. The adoption was a direct result of Australian involvement in Vietnam (1962-1972). The M26 grenade was adopted to replace the aging No. 36M Mk. I as the primary fragmentation grenade in Australian service. It is likely that the M26A1 was supplied to Australian forces from American sources. The 1965 Australian grenade manual shows the M26A1 as the current model. By 1970 the M26A1 had been replaced by the Australian manufactured M26A2.

Grenade, Hand, Fragmentation, M26A2

The M26A2 is an Australian manufactured copy of the American M26A2 made in the Australian Ammunition facilities

TYPE- Fragmentation WEIGHT- 455 g LENGTH- 100 mm DIAMETER- 58 mm IGNITER- M215 FUSE DELAY- 5 sec. FILLING- 66 g RDX/TNT

at St. Mary's under license.

The body is sheet steel made in two parts, the upper portion has the igniter well mounted, and the bottom has a large hole in the bottom to allow filling. The two pieces are attached in the middle by a rolled and seamed joint. The body is lined with a square wire, 1/8" thick that is notched at 1/8" intervals on the inner surface. When the filling of 66 grams of Composition B is put in, the hole in the bottom is sealed with a small fragmentation disc and sheet steel cap. The sheet metal cap is then sealed and seamed onto the body. The M215 igniter mechanism screws into the top of the body.

M26A2
Photo - Bob Perkins

The grenade has an effective casualty radius of 15 metres. This grenade may also be fired from the Australian L1A1 SLR (Self Loading Rifle) fitted with an L1A2 launcher attachment with the grenade fitted into an "Adapter, Grenade Projection, M1A2". It could also be launched from the M16 rifle fitted with a "Retainer Spring, Grenade".

The grenade is painted olive drab with a yellow band around the top and other markings in yellow. Markings on the body include the designation, filling, lot number, and date of manufacture. The safety lever is painted olive drab with markings in black giving the fuze designation and lot number. Early manufactured fuzes have the markings on the top of the lever; later production has the markings on the lever just below the top. In addition there may be a white "XR" stenciled on the lever.

Grenade, Hand, Instructional, M26A2

There are instructional grenades that have been manufactured. These are identical to the live versions; minus the filling but including the markings. The body is painted green with yellow markings giving the designation, manufacturer, and lot number. They are however clearly marked in white on both the fuze mechanism and body of the grenade as instructional. The fuze mechanism is marked on the side of the body "INERT". The body is marked "INERT" over "INSTRUCT" with a heavy white bar between the two words.

Grenade, Hand, Practice M30

TYPE- Practice WEIGHT- 455 g LENGTH- 100 mm DIAMETER- 58 mm IGNITER- M205 FUSE DELAY- 4-5 sec. FILLING- 21 gr.

This is an Australian produced copy of the American M30 practice grenade. It is virtually identical to the American grenade with the exception of markings.

This grenade was designed to represent the M26 grenade. The body is made of cast iron and has a hole in the top threaded to accept the igniter mechanism. An unthreaded hole in the bottom is used for inserting the practice charge and is closed by a plastic plug after loading. This grenade uses an igniting type fuze mechanism to ignite a black powder practice charge. When thrown, the fuze mechanism functions as normal, after a delay of 4-5 seconds the fuze ignites the practice charge and blows out the plastic plug. The ignition of the grenade produces a sharp report and puff of white smoke to indicate the simulated explosion of a grenade.

M30
Photo - Bob Perkins

The body can be used many times by reloading it. The M30 is reloaded by replacing the expended igniter assembly, washer, 21-grain black powder charge and plastic stopper. The powder charge is contained within a small cloth or plastic bag, which is consumed by the ignition of the charge. The replacement parts are supplied in kit form separately from the body. After use the body must be inspected for cracks or damage. If found to be damaged the body must not be used again as the possibility exists that the body could burst producing dangerous fragments.

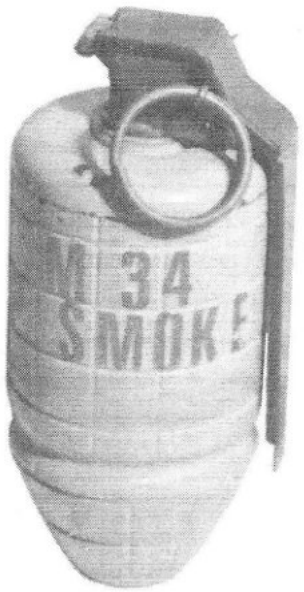
The body is painted light blue, may have a brown band, and has markings in white. Markings give the designation and lot number. The bodies are manufactured by David Shearer & Co. of Mannum South Australia and are normally found with a manufacturers marking cast into the body such as "DS 66". The safety lever is painted light blue with a red lower tip and the top marked in black with the designation, lot number and date. The safety lever handle may also be marked with a white "XR".

Grenade, Hand, Smoke, WP, M34

TYPE- Smoke, WP
WEIGHT- 680 g
LENGTH- 145 mm
DIAMETER- 58 mm
IGNITER- M206A2
FUSE DELAY- 4-5 sec.
FILLING- 340 g

This is an American designed grenade that has been adopted and produced by Australian forces to the same specifications. They were initially adopted during the Vietnam War as a result of Australian involvment in that war. These white phosphorous grenades are often used as all-purpose grenades, providing good effects for Smoke, Incendiary, Anti-personnel, and Signaling.

The cylindrical body is made of rolled steel and is serrated on the outside to aid the body in breaking up on detonation. The base is tapered to enable the grenade to fit the "Adapter, Grenade Projection, M1A2" and be launched from the Australian L1A1 SLR fitted with an L1A2 launcher. In addition there is a groove in the body where the tapered section joins the upper cylindrical section. It is designed so that the claws on the M1A2 adapter clip into the groove providing a secure hold on the grenade. The body contains a filling of 340 grams of white phosphorous. An M206A1 fuze mechanism screws into a threaded detonator well in the top of the grenade.



M34
Photo - Bob Perkins

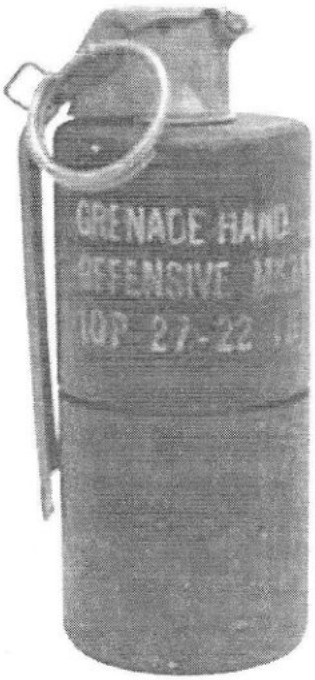
The grenade is painted grey with a yellow band around the body, just above the taper. Markings on the body are painted in red giving the designation "M34 WP SMOKE".

When the safety pin is pulled and the grenade thrown, the striker lever is thrown off by the striker as it rotates forward. The striker continues to rotate on its axis pin until it hits the percussion cap and ignites the delay fuze. The delay fuze burns down and initiates the detonator. The exploding detonator causes the body to burst and scatters the white phosphorous over an area of about 25 metres. The phosphorous ignites upon contact with the air and burns at approximately 5000 degrees for 60 seconds. The burning phosphorous will ignite any flammable material it comes in contact with and inflict serious burns to any personnel in the immediate area. This grenade creates an almost instantaneous screen of thick white smoke.

Grenade, Hand, Offensive, Mk. 3A2

TYPE- Offensive
WEIGHT- 15.6 oz.
LENGTH- 5.35 in.
DIAMETER- 2 1/8 in.
IGNITER- M206A1 or M206A2
FUSE DELAY- 4-5 sec.
FILLING- 8 oz. TNT

During the Australian involvement in the war in Vietnam a need was identified for an offensive style grenade. There was no such grenade in Australian service but the Americans had the Mk.3A2 in quantity. The Australians, rather than design their own, chose to adopt a proven design that could be obtained easily from the Americans.



Mk. 3A2
Photo - M. Eldridge

The body is in the shape of a cylinder and is totally made of asphalt impregnated fibre. The ends are slightly rounded where they meet the sides of the body. The body is made in two sections, the top section fitting over a portion of the bottom. The joint is then covered by a label or strip of tape. The body is filled with 8 oz. of TNT. A hole made in the centre of the top is threaded to fit the fuze mechanism. The igniter mechanism is either the M206A1 or M206A2. A safety clip may or may not be fitted.

The body is black with a yellow label around the centre. Markings on the band are in black and give the designation, lot number, and date of manufacture. Later manufacture of the grenade eliminated the yellow label, instead marking the grenade in yellow directly on the body. The fuze mechanism is olive drab with black markings on top of the safety lever giving the designation and lot number of the fuze mechanism.

The grenade is designed to produce casualties during close combat using concussion effects rather than fragmentation. The effective casualty radius in the open is 2 metres, in confined areas such as bunkers and buildings, the effects would be increased. This grenade can also used as a small demolition charge by placing the grenade in place rather than throwing it. This grenade would have been especially effective in tunnel fighting.

Grenade, Hand, Smoke, F2A1

TYPE- Smoke, Signal
WEIGHT- 525 g
LENGTH- 125 mm
DIAMETER- 63 mm
FUSE DELAY- 0.5 sec.
FILLING- 275 g

This smoke grenade was designed in the 1980's to replace the No. 83 grenade in Australian Service. The grenade was designed and produced by SMAREX (St. Marys Explosives). This is the current Australian coloured smoke grenade, used primarily as a signaling device.

The body is an impact extruded aluminum cylinder closed at the bottom. A cast aluminum cover closes the top end of the cylinder and contains the igniter mechanism and two emission holes. The emission holes are closed by a single piece green or white plastic plug. When the grenade functions the plug is blown off to open the emission holes. In addition there is a threaded nipple to accept an F4 coupling base so that an F1A1 demolition firing device may be used. The igniter is a fairly conventional mousetrap type. The safety lever not only holds the striker in a cocked position but also holds the plastic plug in place until released. The lever is attached to the grenade by a thin plastic tether to prevent foreign object damage when thrown from aircraft. The body contains a filling of 275 grams of smoke composition. The grenade is produced in several colours including blue, red, green, yellow-orange, orange, and yellow. The emission time can be varied by the manufacturer from 15-100 seconds to meet specific needs.

The main body of the grenade is light green; the top is olive green. Markings are in black giving the designation "GREN HAND SMK F2A1", colour of smoke, and lot number. In addition there are three "C's" painted in the colour of the smoke produced.

F2A1
Photo - Bob Perkins

Grenade, Hand, Dummy, F3

TYPE- Drill
WEIGHT- 400 g
LENGTH- 100 mm
DIAMETER- 58 mm
IGNITER- M205 modified

This is a modification of the M30 to create a dummy grenade for instruction and throwing practice. This particular modification has been in Australian Service since about 1990. These grenades were produced by "Munitions Footscray" who also produced the fuze bodies for the M205A2 practice fuze.

The body is a normal M30 body with four evenly spaced 6mm holes drilled around the centre. One set of holes has a 6mm roll pin inserted running completely through the body. This prevents a live practice igniter from being inserted. The igniter mechanism is only the shell of the M205A1 igniter with no contents. The lever has a hairpin spring pop riveted inside to simulate the action of the igniter.

F2A1 fitted with F1A1 Demolition Firing Device
Photo - Rick Landers

Australian Grenades

The entire grenade is painted bronze with stenciled markings in black. Markings give the designation "GRENADE HAND DUMMY F3" and are located on one side of the body flanking the centre seam. As well there are some cast in manufacturers markings "DS" over "66". The "DS" is the marking of David Shearer & Co. of Mannum South Australia, the manufacturer of the bodies for the Australian Defense Forces. There are no markings on the fuze or safety lever.

F3 Dummy

ADI (Australian Defense Industries) Grenades

This is a family of grenades designed and made by Australian Defense Industries Ltd. Within the family are fragmentation, offensive, practice, coloured smoke, WP, red phosphorous, illumination, and incendiary versions. Only the F1 Fragmentation and F3 Practice grenades have been adopted for Australian use. These grenades are designed for ease of manufacture and as such are designed in modules. There are three modules to each grenade, the body assembly, the fuze assembly, and the striker assembly. The striker assembly is common to the grenades; the bodies and to a lesser degree, detonator assemblies differ.

The grenades are adaptable for rifle firing. A tail assembly may be screwed into the body replacing the striker assembly. The tail assembly is of the bullet trap type meaning it may be launched using a ball cartridge. A small booster inside the assembly ensures accuracy and light recoil. The tail assembly contains its own striker mechanism to activate the detonator assembly and comes with a sight that falls off after firing. Due to safety concerns, this has not been adopted by Australian forces.

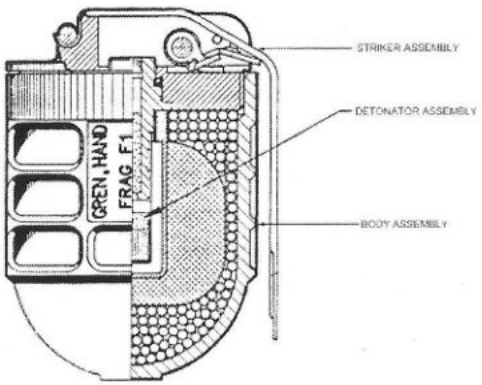
The grenades are designed for use with the F1A1 Demolition Firing Device if required. To fit the firing device, the striker mechanism is removed and the firing mechanism screwed onto the detonator assembly. The grenade body then acts as the explosive charge for a boobytrap that can be either pull, pressure, or release activated.

Grenade, Hand, F1 Fragmentation

TYPE- Fragmentation
WEIGHT- 375 g
LENGTH- 96 mm
DIAMETER- 58 mm
FUSE DELAY- 5 sec.
FILLING- 24 g

The body assembly consists of a green plastic outer casing, the ball matrix and explosive charge. The outer casing is basically cylindrical with a rounded base and is designed to have a good gripping surface. The top is threaded to accept the striker mechanism. The ball matrix contains a minimum of 4000 2.4mm steel balls to provide the fragmentation effects. The explosive charge is 24 grams of RDX/BWX and is surrounded by a "waveshaper". The "waveshaper" is made of dense rubber or similar material and is designed to form an even blast. That and the placement of the charge within the body produces an even distribution of the fragments.

F1 Fragmentation
Photo- Australian Defence Industries



The fuze assembly consists of the percussion cap, fuze delay, and detonator. The fuze delay is of a gasless type giving a very consistent delay time. Delay is 5 seconds + or – 0.5 seconds.

The striker mechanism is common to all the grenades in the series. It consists of a plastic body that is threaded to screw into the top of the body. It is a fairly standard mousetrap type, with the safety lever holding the striker in the cocked position. A safety pin fits through the body also blocking the striker. The safety pin is of a design that is locked in position in a clip molded on top of the mechanism and must be twisted to unlock it and allow its removal. In practice, the striker mechanisms have been sealed in position by "Lock-tite".

The grenade is marked by a smooth yellow hazard band around the top of the body, on a flat portion of the body other markings in yellow give the designation "GRENADE HAND FRAGMENTATION F1" and the lot number of the filled grenade. The lot number is made up of the lot, manufacturer, month, and year of manufacture. The ADI logo is molded onto the body on the curved portion of the base. The yellow hazard band is a plastic band that fits in a groove around the top of the body; it can be removed if necessary. The hazard bands also serve to help identify the grenades at night. Because the bodies for all types are very similar another method of identification was required. The fragmentation grenade has a smooth yellow band; the F2 Offensive grenade (not adopted) has a ribbed yellow band.

F1 Instructional
Photo - L. Monkivitch

Grenade, Hand, Instructional, F1

This is an inert version of the F1 grenade used for training and instruction. It is made exactly like the F1 Fragmentation grenade but has no explosive content.

The grenade is green with the yellow hazard band but has "INERT INSTRUCT" marked in yellow instead of the normal markings on the Fragmentation grenade. The ADI logo is molded on the curved portion of the base.

Grenade, Hand, F3 Practice

F3 Practice
Photo - L. Monkivitch

TYPE- Practice
WEIGHT- 375 g
LENGTH- 105 mm
DIAMETER- 58 mm
FUSE DELAY- 5 sec.

The body of the practice grenade is of steel construction. It is made in the same shape as the Fragmentation grenade but is slightly taller and has an aperture in the bottom. The grenade simulates the weight of the fragmentation grenade. It is reusable by replacing the low explosive charge and recocking the striker mechanism. If damaged the striker mechanism can also be replaced.

When set off, the grenade produces a loud report and puff of white smoke. It produces no dangerous effects and will not damage the grenade body. An aperture in the base of the body allows the force of the spotting charge and the smoke to escape.

The grenade is painted blue and has a smooth brown hazard band around the top of the grenade. Markings are in white and give the designation "GRENADE HAND PRACTICE F3" and lot number of the empty bodies. The letters "PRAC" are molded directly on the body just below the hazard band. The ADI logo is molded onto the curved portion of the base. The striker mechanism being common to all the grenades is the normal green colour.

Canadian Grenades

Up until about 1955, Canada used British designed grenades exclusively. Some were manufactured in Canada such as the No. 36M Mk. I, but up to that point the Canadians had not designed any of their own. In 1952, at a Tripartite Infantry Conference the military characteristics for a fragmentation hand grenade were laid out. In effect, the body of the grenade was to be common but the agreement allowed each country to select its own fuze providing that the fuzes of all countries were interchangeable. The Canadians adopted the US M26 grenade as standard on 21 Sept. 1955. In 1958 a "Canadian Army Equipment Policy Statement (EPS) F2" was issued. This statement laid out the Canadian Army's requirements for grenades. By this time the Canadians had adopted the M26A1 (in 1957) as standard, classified the No.36M Mk. I as limited standard, and still had some numbers of the M26 in service as well. Antitank grenades were still being evaluated, and a Canadian designed and manufactured HCE smoke grenade was under development.

The policy statement identified the requirements for grenades and flares as follows.

1- a fragmentation hand grenade capable of being used as follows: thrown by hand, and projected from the service rifle using a grenade launcher
2- An Anti tank grenade - projected from the service rifle using a grenade launcher.
3- A Smoke grenade- thrown by hand, and projected from both the rifle by means of a grenade launcher and the AFV mounted discharger.

All these grenades must be capable of being launched from the service rifle using a grenade launcher meeting the military characteristics of the section anti tank launcher as described in EPS F1.

The requirement for a colored smoke marker (red, yellow, blue, and green) is contained in EPS A10 Smoke warfare material. This marker is required for air-borne troops for use as a signal device and as a wind direction indicator.

Two hand held devices are required for signaling and illumination within the battalion, one for use by sections, the other by platoons or companies.

Two types of trip flares are required, one to project a flare into the air, the other to ignite in situ, when tripped.

As a result of the policy statement the British No. 83 grenade, modified for Canadian use was adopted as the colored smoke marker and the US M48 and M49 trip flares were adopted as standard. The hand held flares adopted for Canadian use were the Very pistol, firing a 12 gauge flare in two colors, red and green and a parachute illumination flare of Canadian manufacture.

A particular requirement due to the Arctic conditions of Canada's north was that all grenades must have been suitable for use by personnel wearing arctic clothing including handgear.

In addition to the live grenades listed above, the policy statement also identified the need for a drill grenade and instructional grenade. These were to be identical to the Service grenade but with inert fillings.

Initial issues of the M26 (T38E1) grenade were small with the largest issues to the Canadian Brigade Group in Europe for the NATO commitments. The first purchase appears to have been for 2000 grenades from the US mainly for instructional and training use to introduce the grenade as the replacement for the No. 36M Mk. I. The No. 36 was classified "Limited Standard" upon adoption of the M26, however, large stocks of the No. 36M remained and were used for training up until the 1970's. In 1957 the M26A1 replaced the M26 as standard in Canada. The M26A2 grenade was adopted as standard in 1961 and continued in use until the early 1970's when it was replaced by the M61 grenade. The M61 was replaced in the late 1970's by the M67, which remains in service to the present day.

The No. 83 Mk. II (CDN) became the coloured smoke grenade of the Canadian Forces; the T. W. Hand Company of

Ontario and Quebec manufactured these and many of the pyrotechnics used by the Canadians. The No. 83 Mk. II (CDN) was modified to be the No. 83 Mk. 2/1 (C2A1) in the 1960's finally giving way to the C3 grenade in the 70's. In the 1980's a different colored smoke grenade was adopted as an interim measure until a Canadian design could be produced. This was the British Pains Wessex L35-L38 style, known in Canadian service as the No. 4 series. The Canadian designed C8 was adopted in the late 1980's early 90's and remains in service to the present day.

A Canadian designed screening smoke grenade was adopted in the late 1950's, the HCC1 grenade. The HCC1 with minor modifications bringing it to the HCC1A2 designation remained in service well into the 1990's finally being replaced by a new design, C11, made in a similar manner to the C8 grenade. The advantage of the new grenades is their compatibility with Arctic use. They are specifically designed to be used while wearing Arctic mittens.

Gas grenades were not produced in Canada to the best of my knowledge; instead Canada purchased gas grenades from other countries. Initially British designs were used but in the 1960's Canada had adopted some numbers of the US M25A1 for use in riot control and the US M7A3 for use in operations. The M7A3 remains the current gas grenade with the M25A1 out of service.

Grenade, Hand, Smoke, HC, C1

TYPE- Smoke, Screening
WEIGHT- 450 g
LENGTH- 137 mm
DIAMETER- 61 mm
IGNITER- C19
FUSE DELAY- 2-4 sec.
FILLING- 369 g TWH526

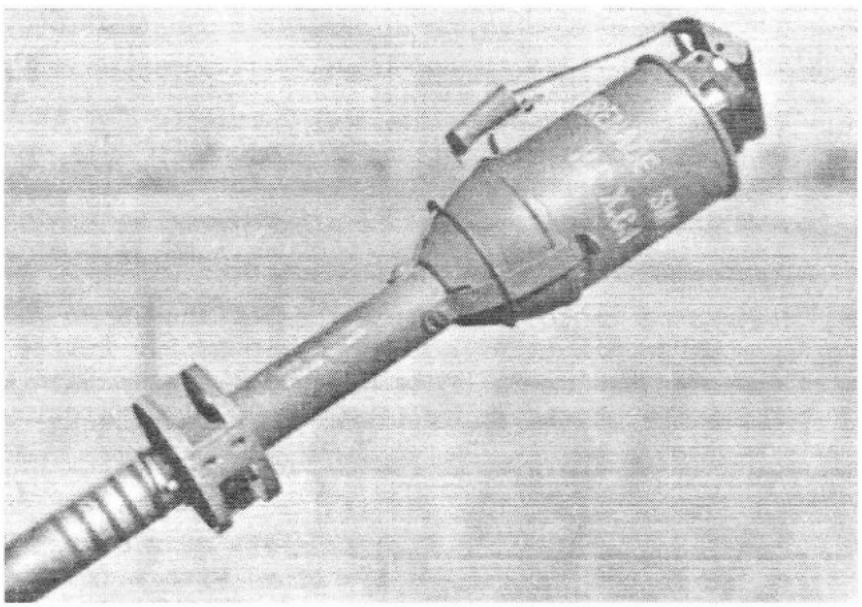
This is the first of the "C" series of Canadian Manufactured grenades. The C1 grenade was adopted in the late 50's or early 60's. It is designed to provide screening smoke.

The body assembly is made up from three separate parts. A tin plate cylinder for the main body, a steel cup for the bottom and a top plate. The bottom cup is seamed onto the cylinder then soldered to seal the joint. The top is formed with a roll-threaded fuze well in the centre with a flash hole in the centre of the well. The top is joined to the cylinder by coating the junction with a sealing compound before being seamed together. There are four emission holes evenly spaced around the top that are closed by zinc discs soldered in position.

HC C1
Photo - Ken Higgins

The body is filled with approximately 369 grams of TWH526. This is a mixture of 1.7% Potassium Nitrate Grade 2, 37.3% Hexachlorethane, 34% Zinc Oxide, and 27% Calcium Sillicide. A small recess is formed in the filling, directly below the flash hole, and filled with approximately one gram of priming composition SR252. A primed cambric disc is then placed on top of the filling and priming compound directly below the fuze well.

A C19 fuze mechanism is screwed into the fuze well. The fuze consists of a moulded plastic body, a striker assembly, safety lever, igniter assembly and insert, and finally a safety pin. The body is moulded with a roll thread on the bottom to fit the fuze wells. This is the same roll threading used on similar British grenades. A recess is formed in the centre to accept the igniter assembly and insert. Shoulders formed on the sides have two holes bored through them, the larger hole to accept the striker hinge pin and a smaller hole to accept the safety pin. The striker assembly consists of a striker, sleeve, hinge pin, and striker spring. The spring is coiled around the sleeve with the ends of the spring bearing against the striker and body of the mechanism. The hinge pin fits through the holes in the mechanism body and through the sleeve. The safety lever fits over the top of the mechanism, hooks on the front of the body and is held in position by the safety pin. The igniter assembly is contained in a modified, primed .45 caliber cartridge case. A mixture of red lead and boron is loaded into the casing directly under the flash channel. A delay element is then pressed into the casing and held in position by necking the case. The open end of the delay element is waterproofed by a coating of lacquer. The C19 fuze mechanism gives a delay of 2-4 seconds.



An early experimental version, the HC XC1, being tested for rifle firing.
The grenade is mounted on the M1A2 adapter.

This grenade was designed for use by hand or fired from a rifle with the attachment of an M1A2 Adapter. The bottom cup of the grenade is designed to fit into the adapter holding the grenade in the proper position on the adapter.

The grenade was painted a light green with black markings. Markings give the designation, identification code, lot number, and date of manufacture. The manufacturers' marking is an integral part of the lot number. These grenades were packed in individual tin container painted dark green with markings on the tin matching the markings on the

grenade. 25 containers are packed in wooden boxes with rope handles.

When the safety pin is removed the safety lever is held close to the body by hand pressure. When the grenade is thrown the pressure of the striker spring asserting itself forces the safety lever to fly off. The lever is thrown clear and the striker rotates on its hinge pin to hit the primer of the cartridge case. The primer fires igniting the red lead/boron mixture which in turn ignites the delay element. The burning of the lower portion of the delay element is sufficient to ignite the primed Cambric disc, which then ignites the charge of SR252, which then ignites the main filling. Thick white smoke is emitted through the four emission holes in the top of the grenade for approximately 60 seconds.

Grenade, Hand, Smoke, HC, C1A1

TYPE- Smoke, Screening
WEIGHT- 450 g
HEIGHT- 137 mm
DIAMETER- 61 mm
IGNITER- C19
FUSE DELAY- 2-4 sec.
FILLING- 369 g

This grenade is modified from the C1 grenade. It is virtually identical to the C1 with some minor differences. Functioning of the grenade is identical.

The body assembly is made up from three separate parts. A tin-plate cylinder for the main body, a steel cup for the bottom and a top plate. The bottom cup is seamed onto the cylinder then soldered to seal the joint. The top is formed with a roll-threaded fuze well in the centre with a flash hole in the centre of the well. The top is joined to the cylinder by coating the junction with a sealing compound before being seamed together. There are four emission holes evenly spaced around the top closed by pressure sensitive tape and coated with primer paint.

The body is filled with approximately 369 grams of TWH526. This is a mixture of 1.7% Potassium Nitrate Grade 2, 37.3% Hexachlorethane, 34% Zinc Oxide, and 27% Calcium Sillicide. A small recess is formed in the filling, directly below the flash hole, and filled with approximately one gram of priming composition SR252.

HC C1A1

A C19 fuze mechanism is screwed into the fuze well on top of an "O" ring. The "O" ring is compressed by the fuze mechanism forming a watertight seal. The fuze consists of a moulded plastic body, a striker assembly, safety lever, igniter assembly and insert, and finally a safety pin. The body is moulded with a roll thread on the bottom to fit the fuze wells. This is the same roll threading used on similar British grenades. A recess is formed in the centre to accept the igniter assembly and insert. Shoulders formed on the sides have two holes bored through them, the larger hole to accept the striker hinge pin and a smaller hole to accept the safety pin. The striker assembly consists of a striker, sleeve, hinge pin, and striker spring. The spring is coiled around the sleeve with the ends of the spring bearing against the striker and body of the mechanism. The hinge pin fits through the holes in the mechanism body and through the sleeve. The safety lever fits over the top of the mechanism, hooks on the front of the body and is held in position by the safety pin. The igniter assembly is contained in a modified, primed .45 caliber cartridge case. A mixture of red lead and boron is loaded into the casing directly under the flash channel. A delay element is then pressed into the casing and held in position by necking the case. The open end of the delay element is waterproofed by a coating of lacquer. The C19 fuze mechanism gives a delay of 2-4 seconds.

The grenade is painted light green with black markings. Markings give the designation, lot number, and date of manufacture. The manufacturers' marking is included in the lot number. These grenades were packed in individual tin cans painted a dark green with markings in yellow. Markings on the cans matched the markings on the grenades. The tins were later changes to an unpainted aluminum tin with a gummed label giving the same information found on the grenade.

Grenade, Hand, Smoke, HC, C1A2

This is a modification of the C1A1 grenade. The details of the construction are identical, as is the functioning of the grenade. This grenade however, uses the C19A1 fuze mechanism.

The C19A1 fuze consists of a moulded plastic body, a striker assembly, safety lever, igniter assembly and insert, and finally a safety pin. The body is moulded with a roll thread on the bottom to fit the fuze wells. This is the same roll

TYPE- Smoke, Screening
WEIGHT- 450 g
HEIGHT- 137 mm
DIAMETER- 61 mm
IGNITER- C19A1
FUSE DELAY- 3.5 sec.
FILLING- 369 g

threading used on similar British grenades. A recess is formed in the centre to accept the igniter assembly and insert. Shoulders formed on the sides have two holes bored through them, the larger hole to accept the striker hinge pin and a smaller hole to accept the safety pin. The striker assembly consists of a striker, sleeve, hinge pin, and striker spring. The spring is coiled around the sleeve with the ends of the spring bearing against the striker and body of the mechanism. The hinge pin fits through the holes in the mechanism body and through the sleeve. The safety lever fits over the top of the mechanism, hooks on the front of the body and is held in position by the safety pin. The igniter assembly is a 3.5 second delay igniter replacing the .45 caliber cartridge case assembly.

These grenades are painted a light green. The markings are applied to the grenade by a clear plastic label with the appropriate markings. Markings give the designation, and identification code, and lot number. They are packed in individual containers. The containers are unpainted aluminum with a gummed label giving the same information found on the grenades. 25 containers are packed in a wire bound wooden packing box.

HC C1A2

Grenade, Hand, Smoke, No. 83 Mk. 2 CDN

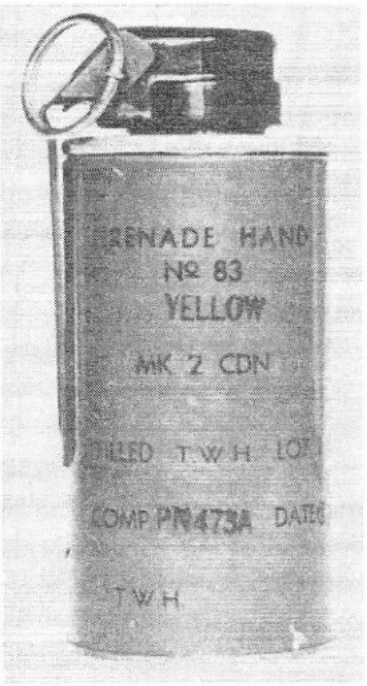
TYPE- Smoke, Signal
WEIGHT- 1 lb.
HEIGHT- 5.33 in.
DIAMETER- 2.4 in.
FUSE DELAY- 2-4 sec.

This is a Canadian development of the British No. 83 Mk. 2. It differs mainly in the filling, safety lever and packing methods. Its main manufacturer was the T.W. Hand Company (T.W.H.) who had factories in both Ontario and Quebec.

The body is made up of several parts. The outer container of tinned plate is cylindrical with a top cap rolled and seamed on. The top cap has a roll threaded recess to fit the striker mechanism and four .25 inch emission holes evenly spaced around the recess. The emission holes are covered by adhesive tape and shellac. The bottom is also rolled and seamed onto the main body. The seam securing the top to the body is recessed into the body; the seam securing the bottom is not.

Contained within the body is a sheet steel canister that is perforated by 0.15-inch holes with the holes on 0.2-inch centre's. This canister contains the smoke composition held in place by a paper wrapper and glue or shellac adhesive coating on the outside. The top is recessed to fit over the striker mechanism recess and a press fit sheet steel cap closes the bottom. A flash hole is located in the centre of the recess on the top. Cardboard discs in the bottom of the grenade ensure the canister is held firmly within the body. The space between the canister and body is empty. A primed cambric disc shellacked in the top of the canister ensures the ignition of the smoke composition. The smoke composition may be of four types, DAD No. 1R for red smoke, PN473A for yellow smoke, DAD No. 1G for green smoke, or DAD No. 1B/V for blue/violet smoke. The composition is stemmed into the canister in four equal increments. This grenade emits smoke for 25 to 45 seconds.

A plastic striker mechanism similar to the British No.4 Mk. 1 but of Canadian manufacture screws into the recess in the top of the grenade. The safety lever is longer on the Canadian Model. The igniter assembly is made of a standard .45 inch rimmed Colt cartridge casing containing a lead sleeve with a short length of one channel safety fuze. The face of the fuze is coated with a thin layer of mealed gunpowder and gum arabic. A small hole is drilled in the head and filled with luting. This prevents the lead sleeve from being blown out when the percussion cap is struck.



No. 83 Mk. 2 CDN

Early stocks of the grenade were produced with an alternative striker mechanism. This one has a short safety lever, a slightly different shaped striker and a plastic sleeve to hold the igniter assembly. The igniter assembly consists of a zinc alloy cap holder and a length of safety fuze. A .22 inch percussion cap is held in the top of the cap holder and sealed with a disc of brown paper secured with shellac.

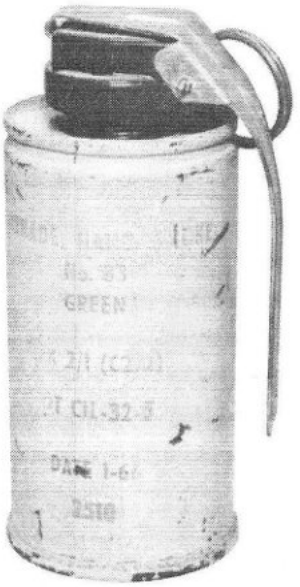
The body is painted green and has black markings giving the designation, manufacturers mark, filling station and date, date of empty body manufacture, manufacturer, lot number, and composition number. In addition a marking just below the designation gives the colour of smoke produced.

Grenade, Hand, Smoke, Blue/Violet, No. 83 Mk. 2 CDN- As above, produces Blue/Violet smoke.
Grenade, Hand, Smoke, Green, No. 83 Mk. 2 CDN- As above, produces Green smoke.
Grenade, Hand, Smoke, Red, No. 83 Mk. 2 CDN- As above, produces Red smoke.
Grenade, Hand, Smoke, Yellow, No. 83 Mk. 2 CDN- As above, produces Yellow smoke.

Grenade, Hand, Smoke, No. 83 Mk. 2/1 (C2A1)

TYPE- Smoke, Signal
WEIGHT- 450 g
HEIGHT- 5.33 in.
DIAMETER- 2.4 in.
IGNITER- C19
FUSE DELAY- 2-4 sec.

This grenade has a cylindrical tinned plate body with the bottom secured by a flanged joint. The top has a roll threaded recess to accept the striker mechanism and four 0.25-inch emission holes evenly spaced around the recess. A flash hole is located in the centre of the recess. The emission holes are closed by adhesive tape and shellac. An "O" ring at the bottom of the fuze well forms a waterproof joint when it is compressed by the striker mechanism. A canister inside the grenade contains the filling. The canister has a depression on the top cap to match the fuze well on the main body, the sides are perforated all over with .15 inch holes and the bottom closed by a press fit cap. The holes in the canister are closed by a paper wrapping secured in place by a coating of shellac or glue adhesive. Cardboard discs in the bottom of the grenade ensure the canister is held in place. The canister has a primed cambric or muslin disc on the bottom of the flash hole. The canister is then filled with about 180 grams of smoke composition in four increments. An ignition charge, 7.5 grams, of the appropriate smoke composition mixed with gunpowder is inserted loosely in the body prior to filling with the smoke increment. The fillings used with this grenade are PN758 for blue/violet, PN759 for green, PN757 for red, or PN760 for yellow smoke.



No. 83 Mk. 2/1 (C2A1)

The grenade uses "Fuze, Hand Grenade, C19". The fuze consists of a moulded plastic body, a striker assembly, safety lever, igniter assembly and insert, and finally a safety pin. The body is moulded with a roll thread on the bottom to fit the fuze wells. This is the same roll threading used on similar British grenades. A recess is formed in the centre to accept the igniter assembly and insert. Shoulders formed on the sides have two holes bored through them, the larger hole to accept the striker hinge pin and a smaller hole to accept the safety pin. The striker assembly consists of a striker, sleeve, hinge pin, and striker spring. The spring is coiled around the sleeve with the ends of the spring bearing against the striker and body of the mechanism. The hinge pin fits through the holes in the mechanism body and through the sleeve. The safety lever fits over the top of the mechanism, hooks on the front of the body and is held in position by the safety pin. The igniter assembly is contained in a modified, primed .45 caliber cartridge case. A mixture of red lead and boron is loaded into the casing directly under the flash channel. A delay element is then pressed into the casing and held in position by necking the case. The open end of the delay element is waterproofed by a coating of lacquer. The C19 fuze mechanism gives a delay of 2-4 seconds.

The body is painted light green with black markings. Markings give the designation, colour of smoke, lot number, date of manufacture, and identification code number.

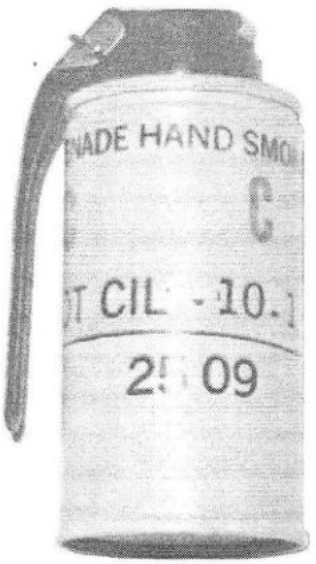
Grenade, Hand, Smoke, Blue/Violet, No. 83 Mk. 2/1 (C2A1)- As above, produces Blue/Violet smoke.
Grenade, Hand, Smoke, Green, No. 83 Mk. 2/1 (C2A1)- As above, produces Green smoke.
Grenade, Hand, Smoke, Red, No. 83 Mk. 2/1 (C2A1)- As above, produces Red smoke.
Grenade, Hand, Smoke, Yellow, No. 83 Mk. 2/1 (C2A1)- As above, produces Yellow smoke.

Grenade, Hand, Smoke, C3

TYPE- Smoke, Signal
WEIGHT- 450 g
HEIGHT- 5.33 in.
DIAMETER- 2.4 in.
IGNITER- C19A1
FUSE DELAY- 7 sec.

This is a modification of the No. 83 Mk. 2/1(C2A1). The main difference is in the fuze mechanism. The fuze delay is 7 seconds instead of 2.5-4.5 seconds. The grenade was produced in the same colours, blue/violet, green, yellow, and red. This grenade was replaced in Canadian Service in the mid 1980's.

The markings have changed somewhat; the body of the grenade is painted light green. The designation, lot number, and identification code number is stenciled on the body in black paint. The letter "C" is stenciled on the body below the designation in the colour of smoke produced.



C3

Grenade, Hand, Smoke, Blue/Violet, C3- As above, produces Blue/Violet smoke.
Grenade, Hand, Smoke, Green, C3- As above, produces Green smoke.
Grenade, Hand, Smoke, Red, C3- As above, produces Red smoke.
Grenade, Hand, Smoke, Yellow, C3- As above, produces Yellow smoke.

Grenade, Hand, Dummy, C4

TYPE- Drill
WEIGHT- 16 oz.
LENGTH- 4.0 in.
DIAMETER- 2.25 in.
IGNITER- M204A1 or M204A2
FILLING- 5.5 oz.

This is a training grenade meant to represent the M26 or M61 grenade. These grenades are not designed for use in throwing practice, but are used for classroom training in the design and function of the grenade.

It is an inert grenade made in exactly the same manner as the live version but with an inert filling. The inert filling gives the grenade the same weight as the live grenade. There are four small holes drilled around the centre of the body to indicate a drill store. The inert fuze mechanism is complete except for a percussion cap. Holes drilled through the detonator and delay portion of the fuze also indicate a drill store. This grenade is not normally found with the safety clip but may have been modified to include it.

C4

The body of the grenade is painted dark blue with white markings. Markings give the designation, identification code number, and include the word "DUMMY" in two places. These grenades may also be found with the body painted bronze and markings in black.

Grenade, Hand, C5

Believed to be a drill version of the No. 80 Mk. 1 WP grenade. This information is not currently confirmed.

C6

Grenade, Hand, Dummy, C6

TYPE- Drill
WEIGHT- 4.8 oz.
HEIGHT- 2.5 in.
DIAMETER- 1.5 in.
FILLING- Inert

This grenade is the dummy version of the Dutch V40 grenade. They are not designed for use in throwing practice, but are used for classroom training on the design and function of the grenade.

The grenade is made in exactly the same manner as a live grenade but has an inert filling. There are four small holes drilled around the centre of the body. The inert igniter mechanism has a solid aluminum detonator section with a hole drilled through the detonator.

The grenade is painted dark blue with white markings. Markings include the designation "DUMMY GRENADE C6" and an identification code number "2538".

Grenade, Hand, Dummy, C7

TYPE- Drill WEIGHT- 14 oz. DIAMETER- 2.5 in. HEIGHT- 3.5 in. IGNITER- M228 Inert

This is a dummy grenade meant to represents the M67 grenade for use in classroom instructional periods on the construction and functioning of the grenade.

It is constructed from an M69 grenade body and a fired M228 fuze mechanism. The body is modified by having four small holes drilled around the centre line. The fuze mechanism is a fired practice charge having the charge container totally removed.

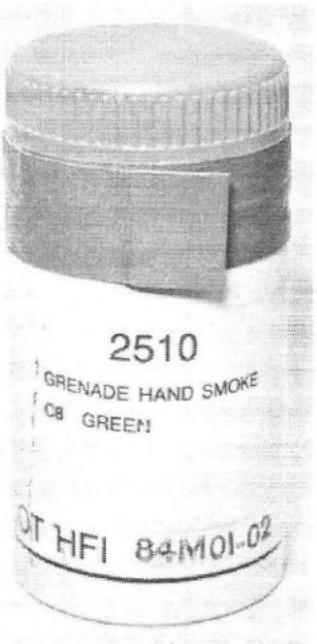
C7

The entire grenade and fuze mechanism are painted dark blue with white markings around the centre of the body. Markings give the designation "DUMMY GRENADE HAND C7" and an identification code number "2540". A new Nato marking standard of bronze overall and black markings has now replaced the blue and white markings.

Grenade, Hand, Smoke, Coloured, C8

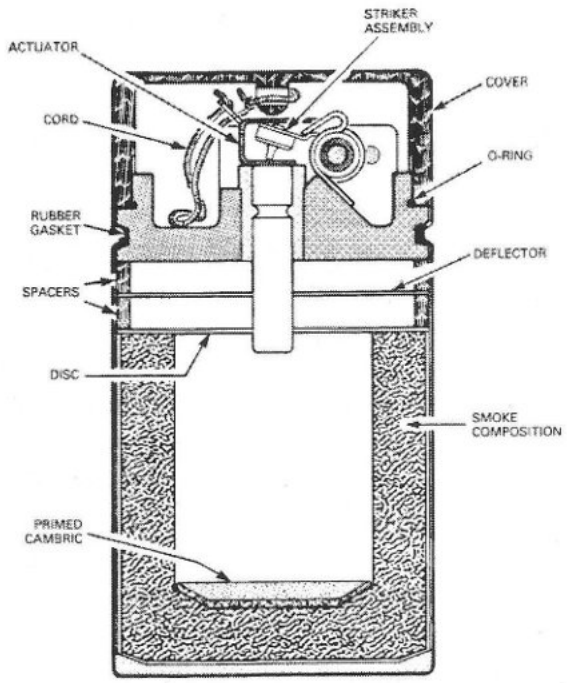
TYPE- Signal Smoke WEIGHT- 300 g HEIGHT- 120 mm DIAMETER- 60 mm FUSE DELAY- 4 sec.

Canadian Forces adopted these grenades in the early 1980's. They are intended as a signaling type grenade for use by ground troops. Used for target and wind direction indication, they can also be used for producing an effective smoke screen. Due to the role of the Canadian Forces in the Arctic these grenades are designed for storage and use within a temperature range of -40 to +52 degrees centigrade. In addition the design allows the grenades to be functioned while wearing arctic mittens.



C8

The body is an impact extruded aluminum alloy can, closed at the bottom end. The body is paper lined then cast loaded with a smoke composition. When the filling is cast, a central cavity is left in the composition, 38-mm diameter and 51 mm deep. A primed cambric disc is affixed to the bottom of the cavity. A centrally perforated galvanized steel disc is placed on top of the filling followed by a cardboard spacer. A tin plate smoke deflector with a central perforation and two off centre perforations is placed on top of the spacer and is followed by another spacer. A rubber gasket is then placed in the can and the phenolic plastic firing assembly placed in the top of the grenade. The body is then crimped into a groove in the firing assembly. The combination of the crimp and rubber gasket seals the grenade against moisture.



The firing assembly is made of a phenolic plastic body that has a striker mechanism fitted into it. An actuator that physically separates the striker and percussion cap is fitted over the firing mechanism. The igniter assembly is fitted in the centre of the body with the percussion cap directly underneath the striker head. It is held in position by a split collar and epoxy cement. The

igniter assembly is 35-mm long and 7.4-mm diameter. It consists of a percussion cap, column of delay composition and 0.4 grams of igniter composition. The delay composition gives a delay of 2-6 seconds.

The cover is made of plastic with internal threading to match threading on the firing assembly. The outside is knurled to provide a firm gripping surface. A projection is moulded internally on the bottom of the top. A waxed cord 20-cm long is attached through a hole in the projection to a hole on the actuator. The cover is colour coded to match the colour of dye used in the smoke composition. A rubber O-ring is placed on the firing mechanism prior to screwing the cover on.

The body is painted light green with a pressure sensitive plastic label attached to the main body. The label gives the designation "GRENADE HAND SMOKE C8", colour of smoke, lot number, DND ammunition identification code, manufacturers mark. The date of manufacture is included in the lot number. The cap, or cover, is moulded in the colour of smoke produced. The tape, which seals the cover onto the body, is also the same colour as the smoke produced. The grenade is produced in red, green, yellow, blue, and violet.

When the cover is unscrewed and pulled, the cord attached to the actuator pulls the actuator up and at the same time the striker. When the actuator is clear it pulls away and releases the striker to fall under pressure of a spring and hit the percussion cap. The percussion cap fires and ignites the delay composition. After a delay of 2-6 seconds the delay composition ignites the ignition charge that flashes and ignites the cambric disc. The cambric disc in turn ignites the smoke composition. The smoke produced emits through a hole in the firing assembly for about 40 seconds.

Grenade, Hand, Smoke, Coloured, Blue, C8 – As above, produces Blue smoke.
Grenade, Hand, Smoke, Coloured, Green, C8- As above, produces Green smoke.
Grenade, Hand, Smoke, Coloured, Red, C8- As above, produces Red smoke.
Grenade, Hand, Smoke, Coloured, Yellow, C8- As above, produces Yellow smoke.
Grenade, Hand, Smoke, Coloured, Violet, C8- As above, produces Violet smoke.

Grenade, Hand, Dummy, C9

This grenade represents the C1A2 grenade. While this designation has been issued, it is not known if the grenade has been produced.

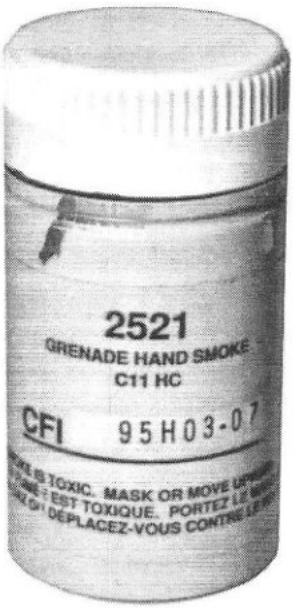
Grenade, Hand, Dummy, C10

This represents the C8/ C11 smoke grenades. While the designation has been issued, it is not known if the grenades were produced.

Grenade, Hand, Smoke, HC, C11

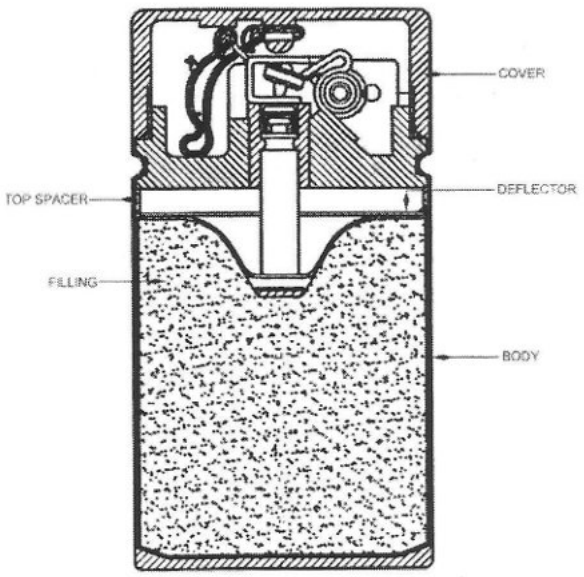
TYPE- Smoke, Screening
WEIGHT- 430 g
HEIGHT- 120 mm
DIAMETER- 60 mm
FUSE DELAY- 3-6 sec.
FILLING- 270 g

This is the replacement for the C1 series of screening smoke grenades. It is similar in look and functioning to the C8 series. The grenade is designed to produce a smoke screen not for signaling although it could be used for that if necessary. Due to the role of the Canadian Forces in the Arctic these grenades are designed for storage and use within a temperature range of -40 to +52 degrees centigrade and the design allows the grenades to be easily functioned while wearing arctic mittens.



C11

The body is an impact extruded aluminum alloy can, closed at the bottom end. The body is paper lined then press loaded with 270 grams of an "HC" smoke composition. When the grenade is filled, a conical central cavity is left in the composition, 16-mm deep with a bottom diameter of 9.6 mm. A primed cambric disc is affixed to the bottom of the cavity. A centrally perforated galvanized steel disc is placed on top of the filling followed by a cardboard spacer. A rubber gasket is then placed in the can and the phenolic plastic



firing assembly placed in the top of the grenade. The body is then crimped into a groove in the firing assembly. The combination of the crimp and rubber gasket seals the grenade against moisture.

The firing assembly is made of a phenolic plastic body that has a striker mechanism fitted into it. An actuator that physically separates the striker and percussion cap is fitted over the firing mechanism. The igniter assembly is fitted in the centre of the body with the percussion cap directly underneath the striker head. It is held in position by a split collar and epoxy cement. The igniter assembly is 35-mm long and 7.4-mm diameter. It consists of a percussion cap, column of delay composition and 0.4 grams of igniter composition. The delay composition gives a delay of 3-6 seconds.

The cover is made of plastic with internal threading to match threading on the firing assembly. The outside is knurled to provide a firm gripping surface. A projection is moulded internally on the bottom of the top. A waxed cord 20-cm long is attached through a hole in the projection to a hole on the actuator. A rubber "O" ring is placed on the firing mechanism prior to screwing the cover on to provide a moisture seal. The filling is an HC compound consisting of 43% Hexachloroethane, 4.5% Potassium Nitrate, 15% Calcium Silicide and 37.5 % Zinc Oxide.

The body is painted light green with a pressure sensitive plastic label attached to the main body. The cover and tape, which seals the cover onto the body, are both white. The label gives the designation "GRENADE HAND SMOKE C11 HC", lot number, DND ammunition identification code, and manufacturers mark. The date of manufacture is included in the lot number. In addition the label gives a warning statement in both English and French. The warning statement is "SMOKE IS TOXIC. MASK OR MOVE UPWIND".

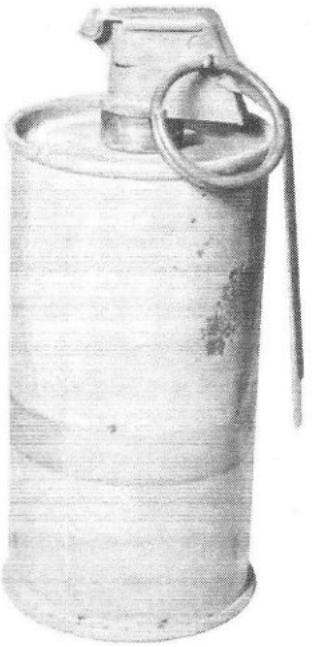
When the cover is unscrewed and pulled, the cord attached to the actuator pulls the actuator up and at the same time the striker. When the actuator is clear it pulls away and releases the striker to fall under pressure of a spring to hit the percussion cap. The percussion cap fires and ignites the delay composition. After a delay of 3-6 seconds the delay composition ignites the ignition charge which flashes and ignites the cambric disc. The cambric disc in turn ignites the smoke composition. The smoke produced emits through a hole in the firing assembly for about 60 seconds.

Grenade, Hand, Riot, M7A2

TYPE- Gas
WEIGHT- 18.5 oz.
LENGTH- 5.7 in.
DIAMETER- 2.5 in.
FILLING- CS or CN
IGNITER- M201A1
FUSE DELAY- 0.7-2 sec.

This riot control grenade is American produced and was adopted for Canadian use. It has been replaced in service by the M7A3.

The body is a cylinder 2.312 inches diameter and 4.68 inches long. It is made in four parts; a tin plate cylinder, tin plate bottom, tin plate top, and steel adapter. The top and bottom are joined to the cylinder with a double seam and soldered. The top is made to receive the fuze adapter that is fitted to a hole in the top and soldered to seal the grenade. The adapter is a 7/8th inch diameter steel tube internally threaded to receive the fuze mechanism. There are three emission holes in the top and a one half inch one in the bottom covered by a small squares of tape. The tape is blown or burned off when the grenade functions. An M201A1 fuze, which gives a delay of up to 2 seconds, screws into the fuze adapter.

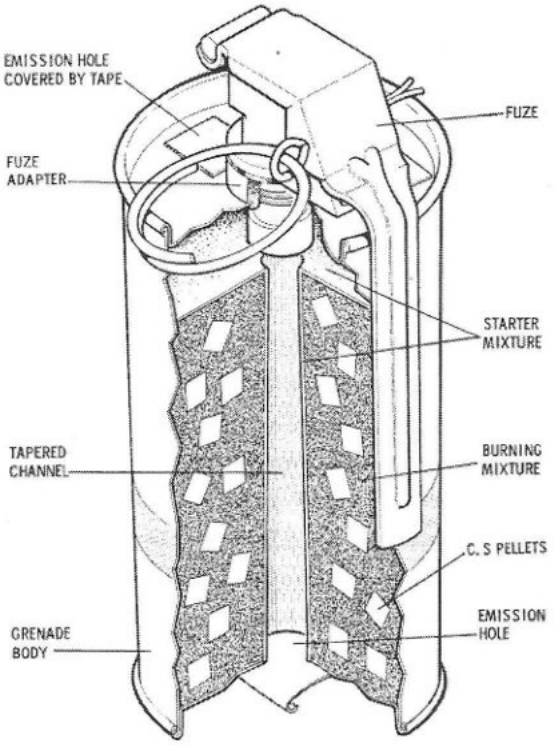


M7A3

The filling is pressed into the body leaving a tapered channel down the center. The bottom of the channel coincides with the emission hole in the bottom plate. The surface of the filling is coated with a starter mixture to ensure ignition by the fuze. The filling consists a burning mixture mixed with either CN or CS. If filled with CS, it is encased in a gelatine capsule.

The body is painted grey with a ½" red band and markings in red. Markings include the designation, filling type, and lot number. The fuze is marked on the olive drab safety lever with its designation, lot number, and likely the manufacturers initials.

When the grenade is thrown, the fuze mechanism gives a delay of between 0.7 and 2 seconds before flashing down into the channel. The flash ignites the starter mixture coating the inside of the channel, which in turn ignites the burning mixture. The burning mixture causes the gas capsules to discharge gas that mixes with the smoke of the burning mixture and is emitted through the holes in top and bottom of the grenade body. The average burning time of the grenade is 25 seconds.



M7A3

Grenade, Hand, Riot, CS, M7A3

TYPE- Gas
WEIGHT- 18.5 oz.
LENGTH- 5.7 in.
DIAMETER- 2.5 in.
FILLING- 4.5 oz. CS
IGNITER- M201A1
FUSE DELAY- 0.7-2 sec.

This is the standard riot control grenade used by Canadian Forces. It is American produced and was adopted for Canadian use in the early 1960's to replace the M7A2. Also in use by American and Australian forces.

The body is made in four parts; a tin plate cylinder, tin plate bottom, tin plate top, and steel adapter. The top and bottom are joined to the cylinder with a double seam and soldered. The top is made to receive the fuze adapter that is fitted to a hole in the top and soldered to seal the grenade. The adapter is a 7/8th inch diameter steel tube internally threaded to receive the fuze mechanism. There are three emission holes in the top and a one half inch one in the bottom. Each hole is covered by a small square of tape which is blown or burned off when the grenade functions. An M201A1 fuze, which gives a delay of up to 2 seconds, screws into the fuze adapter.

The filling is pressed into the body leaving a tapered channel down the center. The bottom of the channel coincides with the emission hole in the bottom plate. The surface of the filling is coated with a starter mixture to ensure ignition by the fuze. The filling consists of 7.35 ounces of burning mixture mixed with 4.5 ounces of pelletized CS. The CS pellets are slightly elongated spheres about 1/4" X 1/4" with rounded ends. Each pellet consists of 78% CS, 20% corn syrup binder, 1% paraffin, and 1% moisture.

The body is painted grey with one red band and markings in red. Markings include the designation, filling type, and lot number. The fuze is marked on the olive drab safety lever with its designation, lot number, and likely the manufacturers initials.

When the grenade is thrown, the fuze mechanism gives a delay of between 0.7 and 2 seconds before flashing down into the channel. The flash ignites the starter mixture coating the inside of the channel, which in turn ignites the burning mixture. The burning mixture causes the CS pellets to discharge gas that mixes with the smoke of the burning mixture and is emitted through the holes in top and bottom of the grenade body. The average burning time of the grenade is 28 seconds. This grenade produces a greater percentage of effective gas than does the M7A2.

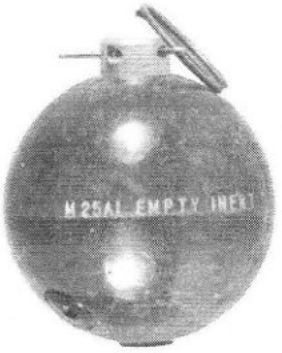
Grenade, Hand, Riot, CN, M25A1

It appears that the Canadian Army purchased stocks of the M25A1 grenade in the 1960's for use in an "Aid to the Civil

TYPE- Riot, Gas
WEIGHT- 7.5 oz.
LENGTH- 3.4 in.
DIAMETER- 2.93 in.
FILLING- 3.5 oz. CN1
IGNITER- C12 Integral

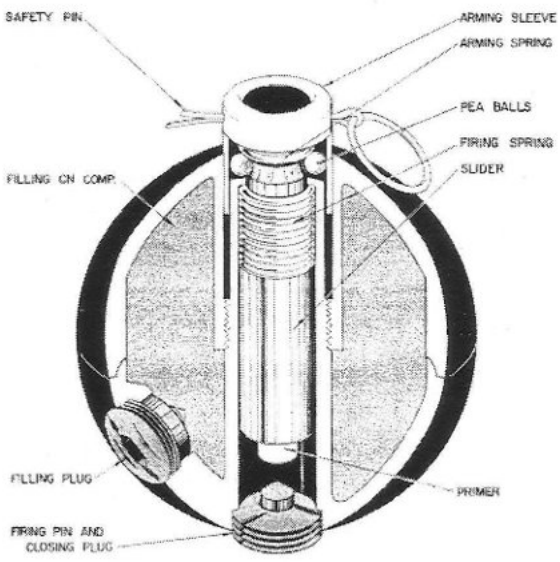
Power" role. These grenades are not used in Military operations but are for use in riot control situations. These grenades are no longer in service.

The grenade body is constructed of two moulded phonelic plastic hemispheres cemented together. The fuze well is formed by upper and lower slider housings moulded as parts of the upper and lower bodies. A plastic closing plug fitted with a striker point on the inner side screws into the bottom of the fuze well. A filling hole is located in the lower half, slightly offside to the centre and is closed by a threaded plug. The fuze is integral with the body. A safety pin fits through the arming sleeve and slider assembly locking the arming sleeve to the body and holding the arming pin in a horizontal position.



M25A1
Photo - Rex Gallogly

The filling consists of 3.5 ounces of a mixture of magnesium oxide and finely pulverized CN. CN-1 has a powerful lachrymal effect. It is irritating to the upper respiratory tract and in higher concentrations is irritating to the skin causing a burning and itching sensation. The gas begins to take effect in 15-30 seconds and the effects last from 5-20 minutes.



When the safety pin is removed the arming sleeve must be held against the body with the thumb or a finger. When thrown, the arming spring ejects the arming sleeve from the body and free two balls to move out of a groove in the top of the slider assembly. This frees the slider assembly, which is then forced down by a spring onto the firing pin, initiating the primer and igniting the delay element. After a delay on 1.4 to 3 seconds the delay element causes the detonator to explode, bursting the body and scattering the filling over an area of 5 metres.

Canadian issued grenades are not marked on the grenade itself. All markings are on the grenade packing container. Markings include a red band, designation, filling type, lot number, and date of filling.

The grenades are packed in individual containers with 50 containers per packing box.

Grenade, Hand, Fragmentation, Delay, M26

TYPE- Fragmentation
WEIGHT- 16 oz.
LENGTH- 4.125 in.
DIAMETER- 2.25 in.
IGNITER- M204A1 or M204A2
FUSE DELAY- 4-5 sec.
FILLING- 5.5 oz.

This grenade was developed just prior to the Korean War and replaced the Mk. 2A1 as the standard American fragmentation grenade during that war. It was adopted by Canada as standard on 21 Sept. 1955 only remaining standard until the adoption of the M26A1 in 1957.

The body is lemon shaped, smooth on the outside, with a flat base, and has a threaded igniter well in the top. The outer casing is made of thin sheet steel in two parts. The two halves are joined by a double lock seam in the middle of the body. Contained within the outer casing is a serrated wire coil completely lining the outer casing. The wire is flat, 1/8" thick, and notched at intervals of 1/8" on the outer surface. This wire lining produces the fragmentation effects of the grenade. A filling of 5.5 ounces of Composition B is contained within the inner fragmentation liner surrounding a Tetryl booster. An M204A1 or M204A2 fuze mechanism screws into the igniter well in the top of the grenade.

The body of the fuze (M204A1) is a zinc alloy die casting with a central channel threaded internally to allow attachment of the delay element. The main housing has a protruding "T" lug is cast onto the front portion for the safety lever to

M26
Photo - Rick Larson

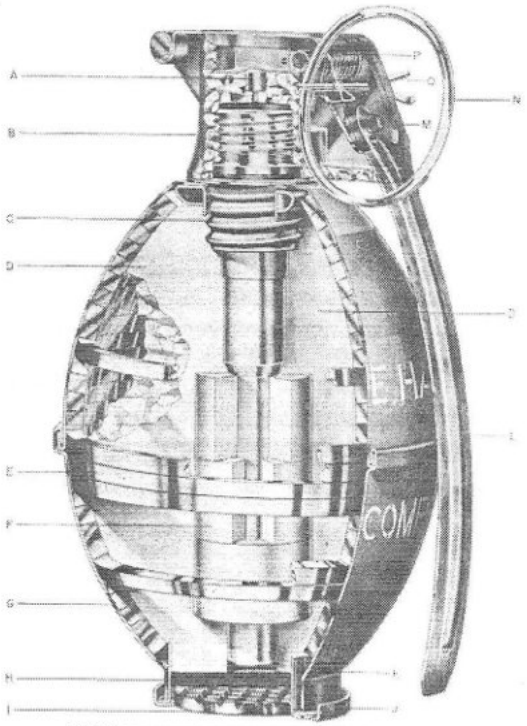
engage. It has standard threads of 9/16-12 on the bottom to screw into the grenade body. The safety lever hooks under the "T" lug, covers the top of the body, and extends down the side of the grenade. The lever holds down the striker until the safety pin is pulled and the safety lever released. The safety pin fits through holes on the safety lever and matching holes in the body. When in position it blocks the striker providing a positive safety for the grenade and holds the safety lever on. The striker and striker spring are contained in the rear portion of the body, retained in place by an axis pin. When the safety lever is held down, the striker is held back against the pressure of its spring. The delay element is a powder train type delay element contained in a small tube. It provides a delay time of 4-5 seconds. The detonator is crimped onto the end of the delay element.

The M204A2 fuze mechanism is a modification of the M204A1. The fuze body and delay housing are manufactured in one piece. The modification was necessary due to the possibility of the delay housing separating from the fuze body when the primer fires. This caused a venting of the delay element and effected the burning time.

The grenade is painted olive green with a yellow band around the top. Markings in yellow give the designation, lot number, type of filling, and date of production. The safety lever is olive drab with markings in black giving the designation, month and year of filling, and lot number of the fuze.

When the safety pin is removed and the grenade thrown the safety lever is released. The striker spring forces the striker to rotate, pushing the safety lever out of the way and away from the grenade. The striker continues to rotate until it hits the primer. When the striker hits the primer it flashes producing a small flame that ignites the delay element. The delay element burns down to the detonator, the detonator explodes setting off a tetryl booster and in turn the main explosive charge. The explosion causes the fragmentation liner to break up into many relatively uniform sized fragments scattering them over an effective radius of 15 metres.

These grenades are packed in individual fiber containers (M289) that are marked with the designation, lot number, filling, and date of manufacture. 25 grenades are packed in a wooden case that is also marked with the same information.



GRENADE, HAND, FRAGMENTATION, M26

A—PRIMER M42
B—FUZE ASSEMBLY M204A1
C—FUZE HOLDER ASSEMBLY
D—BURSTING CHARGE
E—COILED STEEL WIRE
F—BOOSTER PELLET
G—STEEL OUTER COVER
H—PRESSED FELT DISC
I—DISC BASE
J—CLOSING CAP
K—RETAINING RING
L—LEVER
M—STRIKER
N—PULL RING
O—SAFETY PIN
P—STRIKER PIN

Grenade, Hand, Fragmentation, Delay, M26A1

TYPE- Fragmentation
WEIGHT- 16 oz.
LENGTH- 4.125 in.
DIAMETER- 2.25 in.
IGNITER- M204A2
FUZE DELAY- 4-5 sec.
FILLING- 5.5 oz.

This grenade was adopted by Canadian Forces in 1957 to replace the M26 as standard. It remained in service until adoption of the M26A2 in 1961.

This model incorporates some minor modifications over the M26 to improve fragmentation effects. The body consists of two hemispherical shaped pieces of this sheet steel joined in the middle by a double lock seam. After filling the base is closed by a closing cap and retaining ring secured by a 360 degree crimp. The wire lining has been changed to a square wire, 1/8" thick that has 60 degree notches cut at 1/8" intervals on the inner surface. The upper body contains a fuze holder secured in place by an upper retaining ring and soldered joint. The fuze holder is threaded to receive the M204A2 fuze mechanism. The safety lever is modified in that the sides are turned down forming a channeled shape which is much stronger that the flat style used on the M204A1. The bursting charge is 5.5 ounces of Composition B seated on a compressed felt disc. The booster consists of three perforated 52 grain tetryl pellets.

The grenade is painted olive drab with a yellow band around the top and other markings in yellow. Markings on the body include the designation, filling, month and year of filling, and lot number. The safety lever is painted olive drab with markings in black giving the fuze designation, month and year of filling, and lot number.

These grenades are packed individually in fiber containers with 30 containers in a wooden packing box.

Grenade, Hand, Fragmentation, Delay, M26A2

TYPE- Fragmentation
WEIGHT- 16 oz.
LENGTH- 4.125 in.
DIAMETER- 2.25 in.
IGNITER- M215
FUZE DELAY- 4-5 sec.
FILLING- 5.5 oz. Composition B

This grenade was adopted for Canadian use in 1961 to replace the M26A1.

This model differs from the M26A1 in that the diameter of the fuze holder has been enlarged to 5/8" in order to accept the M215 fuze mechanism. The M215 fuze mechanism has a more powerful detonator containing 18 grains of RDX. Use of the M215 fuze mechanism simplifies the filling of the grenade by eliminating the booster pellets.

The grenade is painted olive drab with a yellow band around the top and other markings in yellow. Markings on the body include the designation, filling, month and year of filling, and lot number. The safety lever is painted olive drab with markings in black giving the fuze designation, month and year of filling, and lot number.

Grenade, Hand, Practice, M30

TYPE- Practice
WEIGHT- 12 oz. body
16 oz. total
HEIGHT- 3.09 in. body
4.10 in. total
DIAMETER- 2.43 in.
IGNITER- M205A1

This is designed to be a practice version of the M26 grenade and was adopted by Canadian forces around the same time as the M26 grenade.

The body is made of cast iron with a hole in the top that is threaded to accept the fuze mechanism. An unthreaded hole in the bottom is used for inserting the practice charge and is closed by a plastic plug after loading. The wall of the body is .16 inch thick. This grenade uses an igniting type fuze mechanism (M205A1) to ignite the black powder practice charge. When used, the fuze mechanism functions as normal, after a delay of 4-5 seconds the fuze ignites the practice charge and blows out the plastic plug. The ignition of the grenade produces a sharp report and puff of white smoke to indicate the simulated explosion of a grenade.

M30

The M205A1 fuze mechanism is constructed in two parts in the same manner as the M204A1. The body of the fuze is a zinc alloy die casting with a central channel threaded internally to allow attachment of the delay element. The main housing has a protruding "T" lug is cast onto the front portion for the safety lever to engage. It has standard threads of 9/16-12 on the bottom to screw into the grenade body. The safety lever hooks under the "T" lug, covers the top of the body, and extends down the side of the grenade.

The body can be used many times by reloading it. The M30 is reloaded by replacing the expended igniter assembly, plastic stopper, washer, and black powder charge. The powder charge consists of 37.5 grains of black powder and is contained within a small silk or cloth bag 4.5 inches long and .75 inches wide. The replacement parts are supplied in kit form separately from the body. After use the body must be inspected for cracks or damage. If found to be damaged the body must not be used again as the possibility exists that the body could burst producing dangerous fragments.

The body is painted light blue and may have some markings in white around the centre of the body giving the designation "GRENADE HAND PRAC M30". Normally the bodies are found with markings cast directly into the casting, for example "RFX55 T.5". The safety lever is painted light blue with a red lower tip and the top marked in black with the designation, lot number and date.

The grenade bodies and fuze mechanisms are normally issued as separate items. The bodies are packed in wooden

packing boxes containing 30 bodies. The fuze mechanisms are packed in wooden boxes containing 360 fuze mechanisms and 360 powder bags.

Grenade, Hand, Fragmentation, Delay, M61

TYPE- Fragmentation
WEIGHT- 16 oz.
LENGTH- 105 mm
DIAMETER- 60 mm
IGNITER- M204A2
FUSE DELAY- 5 sec.
FILLING- 5.5 oz.

This grenade replaced the M26A2 in Canadian Service in the early 1970's.

This grenade is basically the M26A1 with the addition of a safety clip. The body consists of two hemispherical shaped pieces of this sheet steel joined in the middle by a double lock seam. After filling the base is closed by a closing cap and retaining ring secured by a 360 degree crimp. The fragmentation liner is a closely wound coil of square wire, 1/8" thick that is deeply notched at 1/8" intervals on the inner surface. The upper body contains a fuze holder secured in place by an upper retaining ring and soldered joint. The fuze holder is threaded to receive the M204A2 fuze mechanism. The safety clip has one end designed to fit around the threading on the M204A2 fuze and the other to clip over the safety lever, preventing it from lifting. The body contains a bursting charge of 5.5 oz. of Composition B. The M61 grenade has a lethal radius of 18 metres and a danger radius of up to 300 metres.

M61

The body of the grenade is painted olive drab with all markings in yellow. Markings give the designation "GRENADE HAND FRAG, DELAY M61", date of manufacture, filling type, and lot number. The safety lever is olive drab with markings in black giving the model and lot number.

This grenade can be projected from a rifle when fitted with an M1A2 adapter. In Canadian use it was launched from the C1A1 rifle fitted with an L1A1 projector.

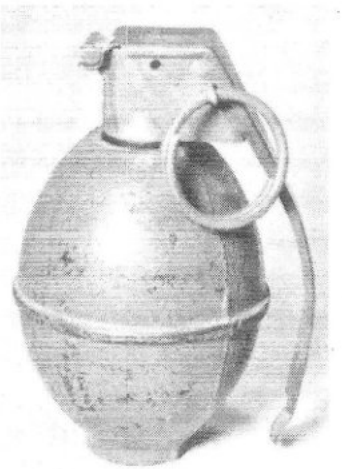
The grenades are packed in individual fiber containers (M289A2). 30 containers fit into a wooden outer packing box.

Grenade, Hand, Practice, Delay, M62

TYPE- Practice
WEIGHT- 16 oz.
HEIGHT- 105 mm
DIAMETER- 60 mm
IGNITER- M205A2
FUSE DELAY- 5 sec.

This is designed to be a practice version of the M61 grenade and was adopted by Canadian forces around the same time as the M61 grenade.

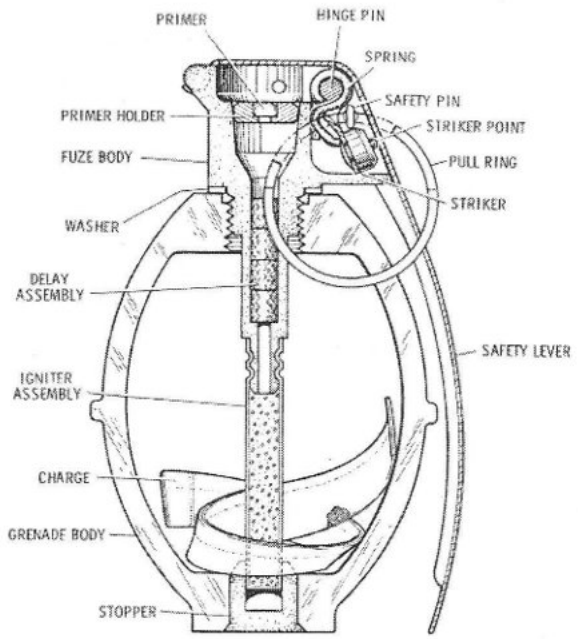
The basic configuration is that of the M30 grenade with the addition of a safety clip and use of the M205A2 fuze mechanism. The body is made of cast iron with a hole in the top threaded to accept the fuze mechanism. An unthreaded hole in the bottom is used for inserting the practice charge and is closed by a plastic plug after loading. This grenade uses an igniting type fuze mechanism to ignite the black powder practice charge. This grenade is required to have the safety clip to properly represent the M61 grenade, which is always issued with the clip. When used, the fuze mechanism functions as normal, after a delay of 4-5 seconds the fuze ignites the practice charge and blows out the plastic plug. The ignition of the grenade produces a sharp report and puff of white smoke to indicate the simulated explosion of a grenade.



M62

The body can be used many times by reloading it. The M62 is reloaded by replacing the expended igniter assembly, plastic stopper, washer, black powder charge, and safety clip. The powder charge consists of 37.5 grains of black powder and is contained within a small silk or cloth bag. The replacement parts are supplied in kit form separately from the body. After use the body must be inspected for cracks or damage. If found to be damaged the body must not be used again as the possibility exists that the body could burst producing dangerous fragments.

The body is painted light blue and may have some markings in white. Normally the bodies are found with markings cast



M62

directly into the casting, for example "RFX55 T.5". The safety lever is painted light blue with a red lower tip and the top marked in black with the designation, lot number and date.

The grenade bodies and fuze mechanisms are normally issued as separate items. The bodies are packed in wooden packing boxes containing 30 bodies. The fuze mechanisms are packed in wooden boxes containing 360 fuze mechanisms and 360 powder bags.

Grenade, Hand, Fragmentation, M67

TYPE- Fragmentation
WEIGHT- 13.9 oz.
LENGTH- 3.53 in.
DIAMETER- 2.5 in.
IGNITER- M213
FUZE DELAY- 4-5 sec.
FILLING- 6.5 oz.

The American M67 grenade was adopted by Canada in the late 1970's to replace the M61 grenade as its primary fragmentation grenade.

The grenade is spherical in shape making it easier to throw accurately. The body is made in two parts, a lower hemisphere and an upper hemisphere with a bushing mounted into a hole in the top. A detonator well is mounted on the bottom side of the hole so that it projects into the body. The body is welded together in the centre. The body is lined with a fragmentation liner with many small projections on the inner surface. A filling of 6.5 ounces of Composition B provides the bursting charge. An M213 fuze mechanism screws into the bushing on top of the body. The M213 fuze mechanism may have either of two types of safety clip. The older style is designed to retrofit early production grenades and fits around the bushing and clips over the safety handle. The newer style clips onto a small projection cast onto the fuze body.

The body is painted olive drab with markings in yellow. Markings give the designation "GRENADE FRAG DELAY M67", filling type, date of manufacture, and lot number. The safety lever is painted olive green and has markings painted on the top surface in black. Markings on the fuze give the fuze model, lot number, and date of manufacture.

When the safety pin is pulled and the grenade thrown, the striker spring causes the striker to rotate and throw the safety lever off. The striker continues to rotate on its axis pin until it hits the percussion cap and ignites the delay element. The delay element is noiseless and sparkless as it burns down to the detonator. When it reaches the detonator it fires the detonator which in turn fires the main bursting charge. The body and fragmentation liner bursts into many fragments that are effective out to 15 metres.

M67
Photo - Rex Gallogly

Grenade, Hand, Practice, Delay, M69

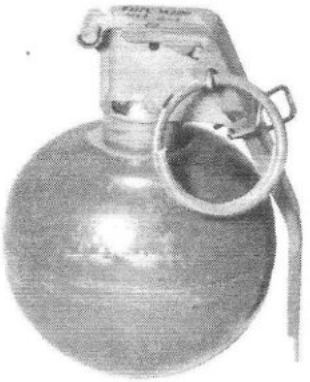
TYPE- Practice
WEIGHT- 14 oz.
HEIGHT- 90 mm
DIAMETER- 70 mm
IGNITER- M228
FUZE DELAY- 4-5 sec.

This is the practice version of the M67 grenade and was adopted for Canadian use at the same time as the live grenade. In Canadian use it is not only used as a practice grenade but also as an instructional grenade. For instruction it is slightly modified and has been redesignated "Grenade, Hand, Dummy, C7"

The body is made of steel in two parts and welded together in the middle. A hole in the base of the grenade allows the gases and smoke from the practice charge to escape. A bushing attached to the top is internally threaded to fit the fuze mechanism. The M228 fuze mechanism incorporates the practice charge, eliminating the separate charges used in previous practice grenades. These grenades may be fitted with either type of safety clip.

The body is painted light blue with markings in white. Markings on the body include the type and Nato stock number. The M228 fuze body is green and the safety lever is light blue with a red tip and markings in black. Markings on the safety lever include the model, lot number, and filling date.

The grenade bodies and fuze mechanisms are normally issued separately. The bodies are packed in wooden boxes containing 50 bodies. The M228 fuze mechanisms are packed in trays containing 45 mechanisms. A wooden box contains 8 trays giving a total of 360 fuze mechanisms per wooden box.



M69

Mini Grenade, Hand, Fragmentation, Delay, V40

TYPE- Fragmentation
WEIGHT- 136 g
HEIGHT- 65 mm
DIAMETER- 40 mm
FUZE DELAY- 4 sec.

This grenade was developed and produced in the Netherlands. It was adopted for Canadian Service in the late 1970's and taken out of Canadian Service in the late 1980's due to safety concerns. It fulfilled the same function as the M61 or M67 grenade but because of its smaller size and weight more grenades could be carried for the same weight. It could also be thrown farther than the other grenades. The lethal radius of the grenade is up to 18 metres from point of burst on hard ground.

The body is steel with 326 squares pressed into the inside surface. A threaded well is formed on the top of the body to receive the igniter mechanism. The igniter mechanism provides a delay of 4 seconds. The safety lever is curved to conform to the shape of the body and curls around to the bottom of the grenade. There is a plastic plug in the top of the safety lever. The plastic plug is used to close the top of the grenade after the detonator with percussion cap is inserted during manufacture. This is a normal safety procedure on Dutch manufactured grenades. The safety pin incorporates a safety clip that holds the pin in until it is rotated to release the clip. When the clip is released the pin can be pulled out in the normal manner.

V40
Photo - R. Leiendecker

The body is olive drab with markings in yellow. Markings are located on the bottom of the grenade and give the designation, lot number, month and year of manufacture.

The grenades are issued in plastic bandoleers containing five grenades. Two bandoleers are contained in a pressed paper box marked with "10 GRENADES, HAND, MINI, FRAG. V40 IN BANDOLEERS OF 5 EACH, LOT NWM 6-70" (Lot numbers change). Sixteen boxes are packed into a steel container that is also marked.

For use hold the grenade so that the safety lever is held tight against the body with the thumb and place the tip of the index finger on the plastic cap. Rotate the safety pin and pull it out. When the grenade is thrown the striker spring reasserts itself causing the striker to rotate on its axis pin. As the striker rotates it throws the safety lever off. The striker continues to rotate until it strikes the primer. The primer ignites the four-second fuze that burns down and initiates the detonator. The detonator causes the explosive to detonate and break the body into fragments. The squares pressed into the inner surface of the body assist the body in breaking up into fragments of a relatively uniform size.

Grenade, Hand, Coloured Smoke, No. 4 Series

TYPE- Smoke, Signal
WEIGHT- 234 g
HEIGHT- 105 mm
DIAMETER- 57 mm
FUSE DELAY- 3 sec.
FILLING- 140 g

These grenades were taken into Canadian service in the 1970's as an interim measure to replace the No. 83 and C3 grenades until a new signalling smoke grenade was developed. They are designed for daylight signalling purposes and were commercially available. They are British manufactured by Pains Wessex and have also been in British service under an L designation.

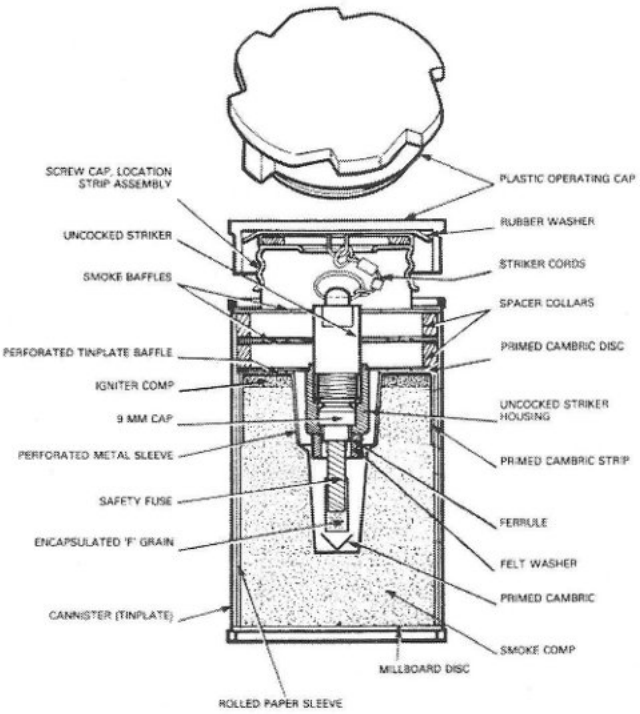
The body consists of a cylindrical tin plate body with a top and bottom secured by folded seams. A roll-threaded neck is centrally mounted in the top. The filling is contained in a rolled paper sleeve, sealed at the bottom by a millboard disc and at the top by a perforated

No. 4/054

tinplate baffle. A central channel in the filling is lined with a perforated metal sleeve. The filling is topped by an igniter composition and a primed cambric disc. A primed cambric strip extends down the central channel. Two tinplate baffles separated by millboard spacer collars take up the space above the filling. A tinplate cap screws onto the neck of the grenade. A plastic cap with serrated edges is mounted on the cap to aid in removal especially when wearing arctic mittens.

The igniter mechanism consists of a plastic body containing a striker and striker spring. The spring bears against shoulders at the top of the body and the head of the striker. The spring is not under tension. A split plastic claw fits over an enlarged portion at the back end of the striker. The claw fits into the top of the body holding it in place. A metal ring is attached at the top end of the claw. A cord runs from the ring on the claw to a ring soldered to the bottom of the cap. Screwed onto the base of the igniter is an aluminum adapter holding a 9mm cap attached to a length of safety fuze. An encapsulated igniter composition is attached at the lower end of the safety fuze. The safety fuze provides a delay of approximately 3 seconds.

The grenade is painted light green with markings stenciled in black. Markings give the designation, colour of smoke, burning time, lot number, date of manufacture, Nato stock number, and manufacturer. The colour of smoke is also indicated by the colour of the plastic cap.



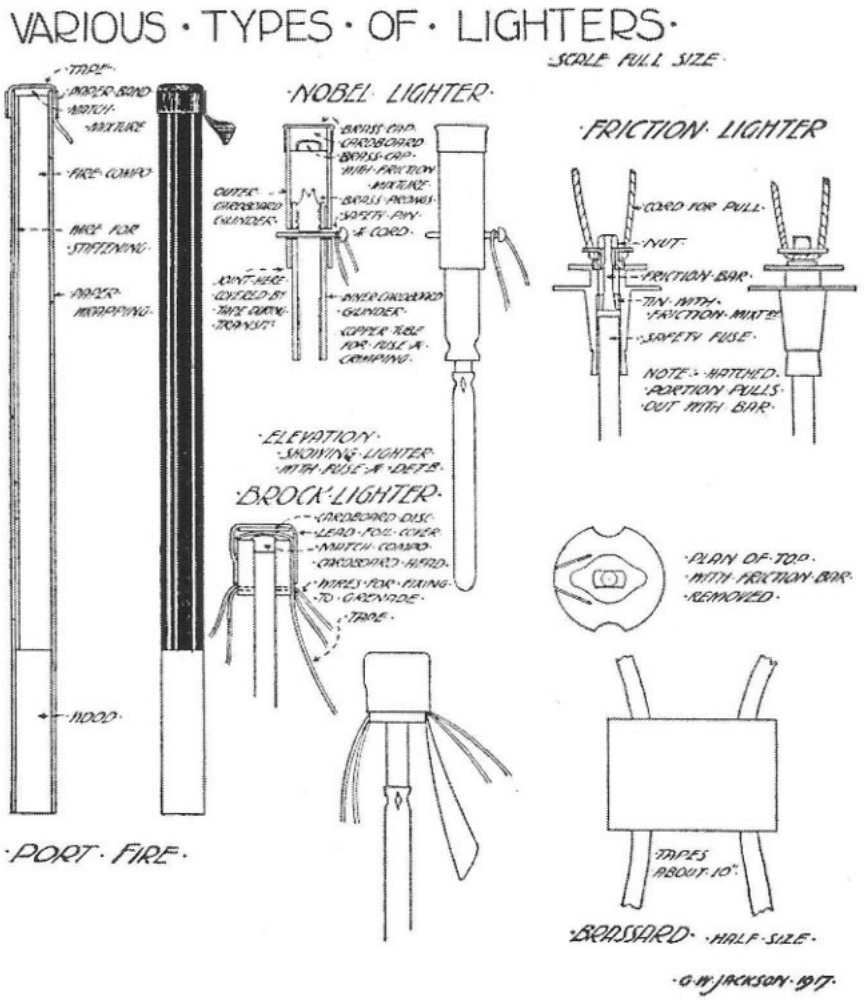
For use, grasp the grenade in the throwing hand, with the other hand unscrew the cap and extend to the length of the cord. When the cap is pulled, the claw is drawn out of the body pulling the striker with it. This action compresses the striker spring at the same time. When the claw is fully free of the body it is free to split apart and release the striker. The striker spring, then compressed, reasserts itself driving the striker down onto the percussion cap. The percussion cap fires igniting the safety fuze which in turn ignites the igniter composition. The igniter fires the cambric disc that flashes into the central channel igniting the cambric strip. This ignites the main smoke filling. Smoke will be emitted through the top of the grenade for approximately 45 seconds.

Grenade, Hand, Coloured Smoke, No. 4/051 - As above, produces Red smoke.
Grenade, Hand, Coloured Smoke, No. 4/052 - As above, produces Yellow smoke.
Grenade, Hand, Coloured Smoke, No. 4/053 - As above, produces Green smoke.
Grenade, Hand, Coloured Smoke, No. 4/054- As above, produces Blue smoke.

Lighters, Fuzes, and Striker Mechanisms

Nobel's Lighter

This lighter consists of two cardboard tubes, one fitting over the other. The larger tube is closed at the top end by a brass cap and contains a small brass cap containing a match head composition. Two friction points are mounted on the top of the smaller tube and a thinner copper tube is inserted at the bottom end. The friction points are held away from the match head composition by a safety pin passing through both tubes. Safety fuze is inserted in the end of the smaller tube and crimped using the copper tube. When the safety pin is removed and the larger tube forced down, the friction points cause the match head composition to ignite, which lights the fuze in the small tube.



Drawing done in 1917 by G.W Jackson

Brock Lighter

This lighter consists of a small cardboard head filled with match head composition and covered with waterproof paper or lead foil. Wires for attaching the lighter to the grenade are wrapped around the base of the cardboard head. Safety fuze is inserted in a hole left in the base of the head. When the paper or lead foil is torn off and the match head composition struck with a brassard it ignites the composition that in turn ignites the safety fuze.

Fuze No. 247 Mk 1

This fuze is of the "Allways" type, in that, it is designed to function on impact no matter what the angle it strikes. It was originally designed for the No. 69 grenade but its use was extended to other patterns as the need arose. Minor modifications to meet the requirements of each grenade were made to the mechanism.

The fuze body is made of bakelite. It is internally recessed to accommodate the detonator pellet, striker, creep spring, and ball. A threaded cup closes the top and there is a flash hole in the base. The base is roll threaded to match threading in the grenade body. The centre of the body is reduced in diameter to form a seat for the safety bolt and weighted tape. The top is threaded to match threading in the safety cap. There is a hole bored through the body in the centre section to fit the safety bolt. The 11.5 inch weighted tape is attached at one end to the safety bolt and the other to a lead sleeve. The safety bolt fits through one of the holes in the fuze body passing through a corresponding hole in the striker preventing the striker tip from reaching the detonator. The tape is then wound clockwise around the body over the safety bolt. The detonator is mounted in the detonator pellet by burring over a lip formed on the bottom of the pellet. The steel striker, surrounded by a steel creep spring, fits into the detonator pellet with the creep spring holding the striker away from the

detonator. The lead ball fits between the concave head of the striker and underside of the threaded cup. A bakelite safety cap screws over the fuze, holding the tape and weight in position. In transit the cap is held by a piece of adhesive tape.

Mk. 1A- indicates the material used in the detonator pellet is brass.

Mk 1Z- indicates the material used in the detonator pellet is a zinc based alloy.

In the original design of the fuze, the bottom of the body and flash hole were extended to form a small spigot. This was not suitable for all types of grenade using the No. 247 fuze and later production have a flat base.

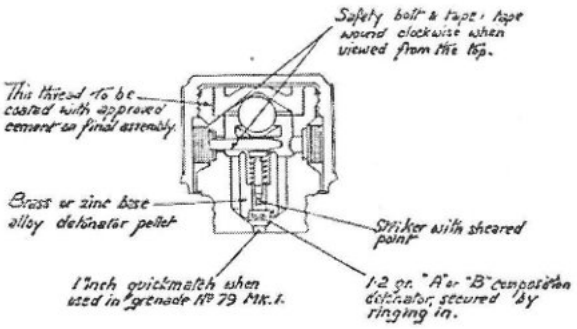
Modifications to the fuze for different grenades are as follows.

No. 69 Mk. I and No. 73 Mk. I grenade- Original design, no modifications. The cap is unpainted leaving the natural black colour (red colour for some Australian manufactured fuzes) of the bakelite.

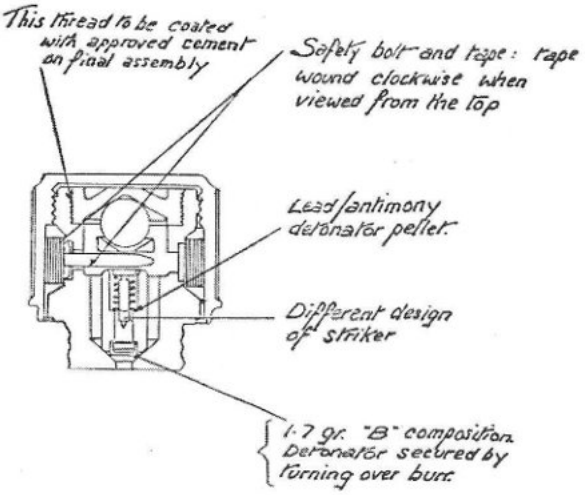
No. 77 Mk. I grenade- The small spigot on the bottom of the fuze is removed. The cap is unpainted leaving the natural black colour of the bakelite.

No. 79 Mk. I grenade- The detonator is filled with "B" composition instead of the normal "A" composition and a 1 inch piece of quickmatch is inserted in the flash hole. The cap is painted green.

No. 82 Mk. I grenade- The tape is reduced to 4.5 inches to reduce arming time. The cap is painted red.


Safety bolt & tape: tape wound clockwise when viewed from the top.
This thread to be coated with approved cement on final assembly
Brass or zinc base alloy detonator pellet
Striker with sheared point
1 inch quickmatch when used in grenade No 79 Mk. I.
1.2 gr. "A" or "B" composition detonator secured by ringing in.

Fuze, No. 247 Mk. 1


This thread to be coated with approved cement on final assembly
Safety bolt and tape: tape wound clockwise when viewed from the top
Lead/antimony detonator pellet
Different design of striker
1.7 gr. "B" composition Detonator secured by turning over burr

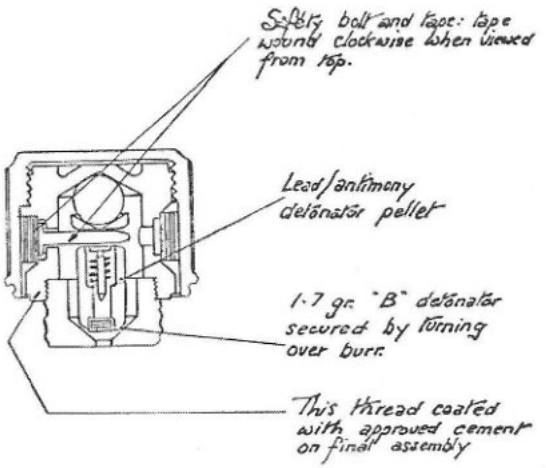
Fuze, No. 247 Mk. 2

Fuze, Drill, Percussion No. 247 Mk. 1

This was introduced in 1942 as a purpose made drill fuze. Prior to that empty fuzes were used in drill grenades. The fuze body is either filled with wood or has an empty detonator shell. Fuze is painted white all over.

Fuze No. 247 Mk. 2

This fuze differs from the Mk. I by having a different design of striker. The point is shorter, is not sheared, and has a slightly different form. The detonator pellet is made of lead/antimony and has a different form of chamber for the detonator. It also has a 1.7 grain, "A" composition detonator instead of the 1.2 grain detonator of the Mk. 1.

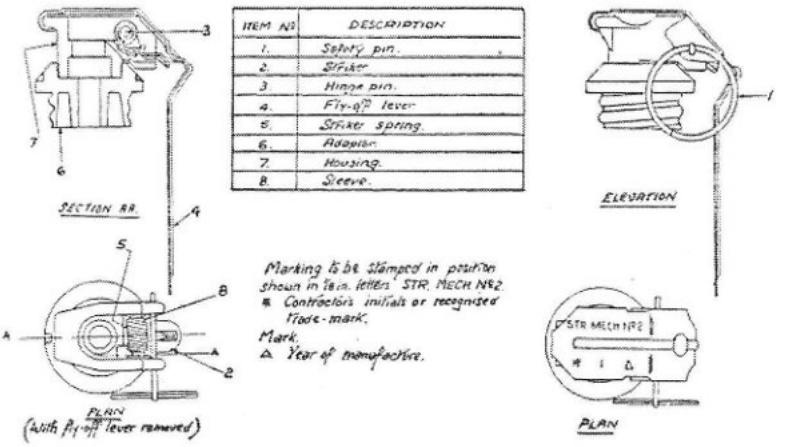

Safety bolt and tape: tape wound clockwise when viewed from top.
Lead/antimony detonator pellet
1.7 gr. "B" detonator secured by turning over burr.
This thread coated with approved cement on final assembly

Fuze, No. 247 Mk. 3

Fuze No. 247 Mk. 3

The Mk. 3 was introduced to facilitate ease of assembly and differs only in that the cup seat for the lead ball is moulded integral with the body, and the base is closed with a screwed plug.

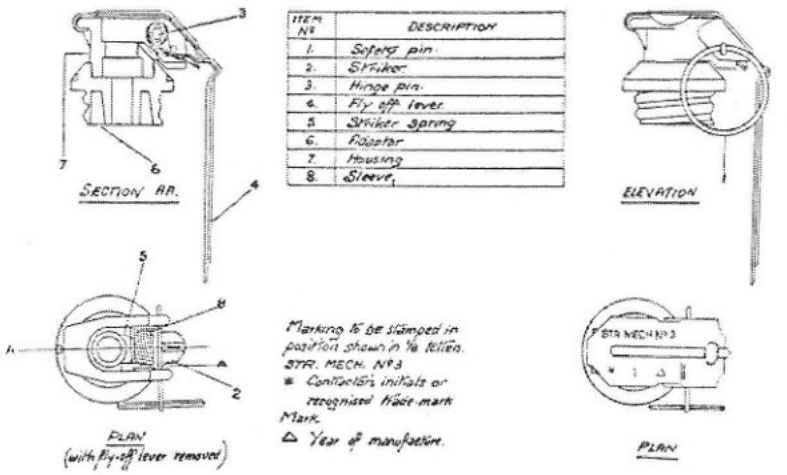
The fuzes were initially not marked with any particulars other than the manufacturers mark. After extension to other grenades the fuzes were marked more clearly. The empty fuze is marked on the top of the safety cap with the designation, manufacturers mark, and year of manufacture. These markings may be cast on or stamped into the cap. Filled fuzes have additional markings stenciled on the top of the cap and on the exposed surface of the tape. These markings give the fillers initials or mark, date of filling, lot number, and the letter "A" or "Z" after the mark to indicate the material of the detonator pellet. The caps may be painted as detailed above.



Striker Mechanism, No. 2 Mk. 1

Striker Mechanism, No. 1 Mk. 1
This was the original model of this type of mechanism. Both the body and adapter were made of Mazak. The striker, striker lever, and striker spring are steel and the sleeve is brass. The shank of the safety lever was straight. There were no grenades produced that this particular model would fit; therefore it never entered production stages.

Striker Mechanism, No. 2 Mk. 1
The lever on this model is shaped to fit the contour of the No. 80 Mk. I grenade. The body and adapter are made of Mazak; the striker, striker lever, and spring are made of steel. The striker recess in the body is edged by two ribs joined at the base by a web of metal.



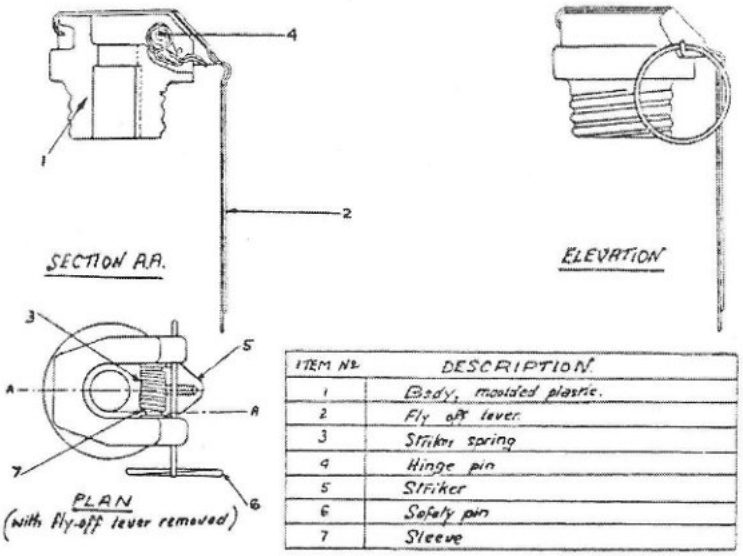
Striker Mechanism, No. 3 Mk. 1

Striker Mechanism, No. 2 Mk. 1/1
As for the No. 2 Mk 1 but the web joining the two ribs is omitted.

Striker Mechanism, No. 2 Mk. 1/2
The base adapter is modified by having the central spigot shortened so that it is 0.11 inch shorter than the surrounding skirt.

Striker Mechanism, No. 3 Mk. 1
This mechanism is exactly the same as the No. 2 Mk. 1 but the lever is shaped to fit the contour of the No. 81 and No. 83 Mk. 2 grenade.

Striker Mechanism, No. 3 Mk. 1/1
The metal web is omitted as in the No. 2 Mk. 1/1. It is also fitted with an alloy adapter 1.5 inches in diameter to fit the No. 83 Mk. 2, No. 83 Mk. 2/1, No. 91 Mk. 1, and No. 95 Mk. 1.



Striker Mechanism, No. 4 Mk. 1

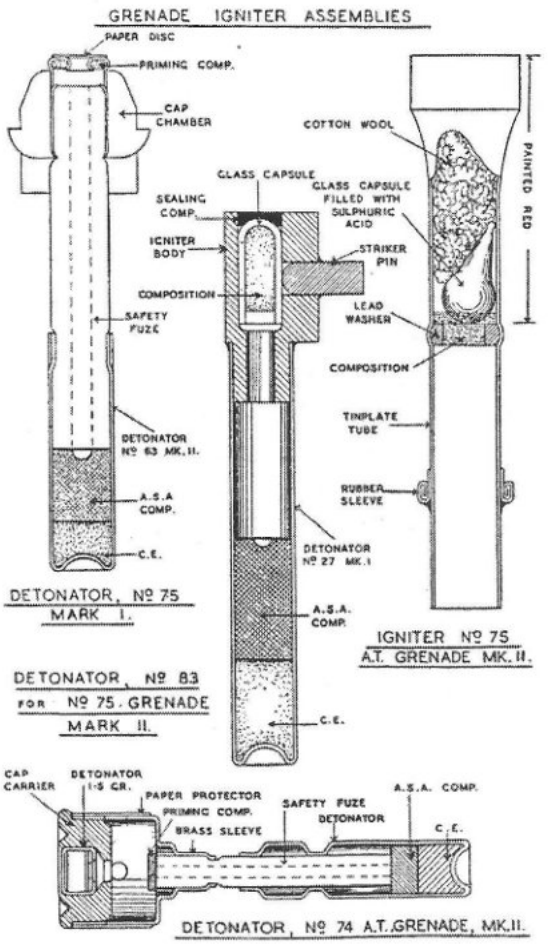
Striker Mechanism, No. 3 Mk. 1/1
The metal web is omitted as in the No. 3 Mk. 1/1. It is also fitted with an alloy adapter 1.5 inches in diameter to fit the No. 83 Mk. 2, No. 83 Mk. 2/1, No. 91 Mk. 1, and No. 95 Mk. 1.

Striker Mechanism, No. 3 Mk. 1/2
This striker mechanism is not fitted with an adapter so as to fit the No. 83 Mk. 3/1 and No. 83 Mk. 3/2

Striker Mechanism, No. 3 Mk. 1/3
Similar to the No. 3 Mk. 1/1 but fitted with an adapter in which the central spigot is 0.11 inches shorter. This facilitates the spread of flash on ignition. Used with grenades No. 83 Mk. 2, No. 83 Mk. 2/1, and No. 91 Mk. 1.

Striker Mechanism, No. 4 Mk. 1
Similar to the No. 3 Mk. 1/1 and No. 3 Mk. 1/3 but this mechanism has a body and adapter moulded in one piece from a plastic material. It is fitted with a moulded plastic sleeve to hold the igniter. Normally used with the No. 83 Mk. 2, No. 83 Mk. 2/1, and No. 91 Mk. 2.

Striker Mechanism, No. 6 Mk. 1
This mechanism has the same body and adapter as the No. 4 Mk. I but has a striker lever of a shape and size to fit the No. 92 Mk. 1 grenade.



Igniter, Grenade, No. 1 Mk.1
This igniter consists of a cap chamber, .22 inch rim-fire cap, 1/2 inch piece of "Fuze, Grenade, Mk.1" (formerly known as Fuze, Safety, No. 20) and a blob of PN623. The cap chamber is made of zinc alloy with a straight base and coned upper section. A .22 inch hole is drilled through the centre from top to bottom and the bottom has a transverse slot running from side to side. The .22 inch cap is fitted into the hole in the cap chamber. The cap is copper and the base is pierced to form a gas escape to vent the fuze after ignition. A paper disc covers the base of the cap and is secured with shellac. The cap is securely crimped to one end of the fuze. The blob of PN623 is thickly applied to the end and sides of the fuze covering all exposed surfaces. It also fills the unoccupied space in the slot in the cap chamber.

Igniter, Grenade, No. 2 Mk. 1
This igniter has a cap chamber fitted with a .22 inch rim-fire cap and a length of "Fuze, Instantaneous". Prior to 11 Oct 1957 the fuze was 0.8 inches long. Used in conjunction with Striker Mechanisms No. 3 Mk. 1/1, No. 3 Mk. 1/3 and No. 4 Mk. 1. After that date, the fuze was 1.1 inches long and was used with striker mechanisms No. 3 Mk. 1/2.

Igniter, Grenade, No. 2 Mk. 1/1
Similar to the No. 2 Mk. 1 this one has a piece of "Fuze, Instantaneous" 1.83 inches long with the exposed end covered with a blob of PN623

Igniter, Grenade, No. 2 Mk. 2
This Igniter was introduced in September 1964. It is like the No. 2 Mk. 1 but has 1.1 inches of "Fuze, Instantaneous". The cap has a different ignition composition with better storage life.

Detonator, Rifle Grenades, Mark I

Originally issued as the "Detonator, Nos. 3 and 4 Rifle Grenades, Mark I" but it was redesignated when its use was extended. It consists of a brass holder threaded at the top end and having a knurled head. A closing plug screws into the holder at the head. A tubular extension on the holder has an internal flange that divides the extension into two chambers of unequal size. A primer containing 3 grains of 6.6.4 composition fits into the smaller chamber at the lower end of the

extension. The primer is retained in position by having the end of the extension spun over the cap. A detonator with its closed end pierced by four small holes, fits into the extensions large chamber through the top end. First a felt plug and then a wooden plug are inserted after the detonator to hold it in position and the whole thing closed by a closing plug.

With the "A" filling the detonator is charged with 17 grains of fulminated mercury and 33 grains of C.E. This type is used when grenades are filled with Trotyl or amatol 60/40.

The "B" filling consists of 45 grains of fulminate of mercury. This type is used with grenades containing amatol 80/20 or ammonal.

The detonators assemblies are differentiated by the letter of the filling being stamped on the head of the holder.

This type of detonator assembly was used with the Nos. 3, 3A, 4, 10, 11, and 20 rifle grenades.

Detonator, Rifle Grenade, Mark II

This detonator assembly was used for land service only with the Nos. 3, 3A, and 20 rifle grenades. The holder is the same as the Mk. I but the primer has been replaced by .162 percussion cap in a shortened .297/.230 cartridge case. The cartridge case is fitted into the lower end of the holder with the rim resting against the inner flange of the extension. A brass washer is fitted over the head of the case and the extension then spun over securing it all in place. The detonator contains only the "B" type filling.

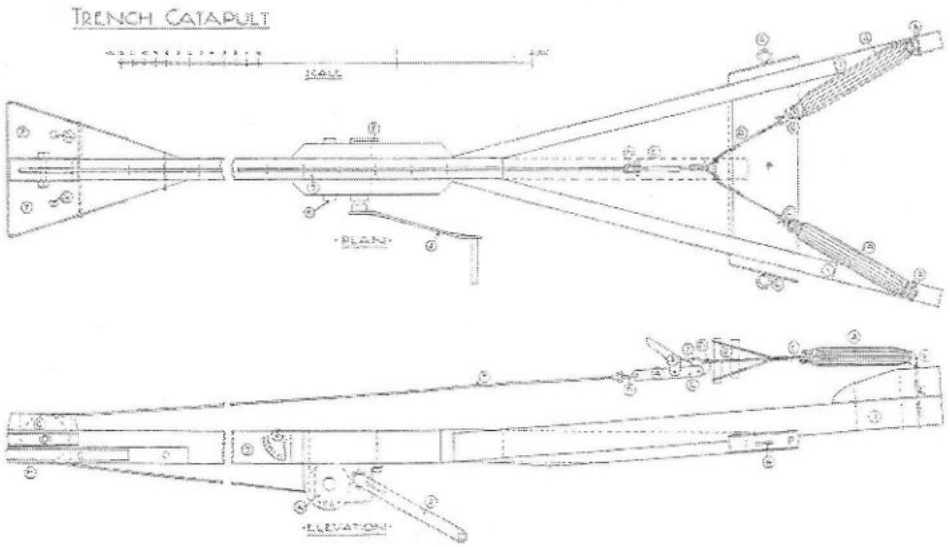
Leach Trench Catapult

This bomb-throwing device was invented by Claude Pemberton Leach in 1914 and submitted to Colonel Louis Jackson for his approval. At this point Leach claimed his device would hurl a golf ball to a range of 200 metres. Jackson saw potential in the catapult but suggested it needed strengthening so that it could fire a heavier weight. Leach modified the catapult and succeeded in getting it to throw a 2-lb. weight out to ranges of about 200 metres. At this point, Leach took the device to Gamages Department Store and together they applied for a patent on 22 May 1915. The patent, #7710/15 was granted a year later.

The catapult was being used at the front prior to the patent being applied for let alone granted. It was being made in Gamages factory but some were used in the Dardanelles that had been made by the Engineers of No. 2 Co. of the Royal Naval Division.

The catapult is in the form of an enlarged "Y" shape. There is a central beam with two horns mounted on the front end. The horns are strengthened by bracing pieces. At the bottom end is a fishtail shaped trail. Rubber springs are attached to the ends of each horn, with a canvas pouch attached to the other end of each set of springs effectively attaching the two sets together. The back of the canvas pouch has a loop attached to it that engages in a hook on the trigger mechanism. A tensioning wire runs down the length of the central beam, through a pulley mounted in the fishtail and up the underside of the beam to a gearbox. The trigger mechanism is attached to the front end of the wire. The gearbox has a winding handle on the right side and a holding pawl on the left. There is a clinometer attached on the right side of the central beam just behind the gearbox.

When emplacing the catapult it was important that it be placed at an angle of between 35 and 45 degrees. The catapult needed to be level with the horns on either side at the same level. The central beam was placed on a firm support and support built up under the horns using sandbags. The trail was embedded in sandbags ensuring that the pulley and wire could operate without hindrance. To further steady the catapult a sandbag was suspended from two eyebolts located on each side of the bracing piece.



For use the catapult needs to be cocked. To cock it the pawl was lifted and the tensioning wire drawn out to its full extension. The hook on the trigger mechanism was engaged in the loop on the pouch ensuring that the tail of the trigger hook was engaged in the firing lever. The rubber springs were then extended by cranking the winding handle that drew back on the tensioning wire winding it on the drum in the gearbox. When the desired tension was achieved the pawl was engaged preventing the wire from unrolling and allowing the springs to lose extension. Ranges were determined by the amount of tension applied to the springs, noted by a range scale stamped on top of the central beam.

As soon as the correct tension was applied to the springs the projectile was loaded. It was the practice to not allow the tension on the springs to remain any longer than necessary, in fact, only long enough to load the projectile and fire the catapult. This prevented early deterioration of the springs. The catapult was fired by grasping the trigger bar and firing lever in the hand then giving it a short hard squeeze until the trigger released.

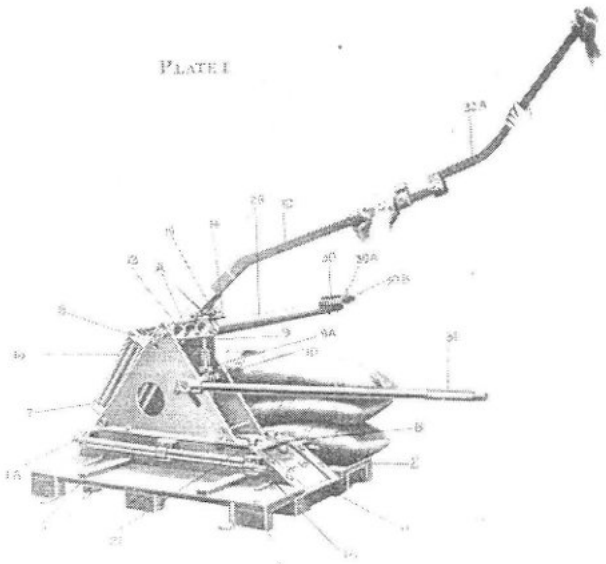
Commonwealth Grenade Accessories

The Leach Trench Catapult was discontinued as Service equipment on 13 July 1916, mostly due to the supply of 3" Stokes mortars being adequate to replace them. This does not mean that the ones at the front were all disposed of, they may well have continued in use for some time after that date.

West Spring Gun

This was the only "Spring Gun" to enter British Service. It was invented by one Captain West and manufactured by the "Reason Manufacturing Company". The company applied for a patent on 19 October 1915, which was subsequently, granted as number 14793/15.

It was a complicated and heavy contraption that required a large emplacement to be operated from. The emplacement needed to be 8-9 feet square and as level as possible. The bed of the gun was then placed on the base and two sandbag boards attached to the bed, one on either side. At least six full sandbags were then placed on each of the two boards to stabilize the gun.



West Spring Gun

There were two types of throwing arm, the earlier version was a single piece, the later version came in two parts. The "Bomb Cup" was attached to the end of the throwing arm and could be of two types. One was for use with spherical or oval bombs fitted with percussion fuzes and the other for cylindrical bombs fitted with time fuzes. The later cup, while marked "FOR CYLINDRICAL BOMBS ONLY" could and was used for spherical bombs as well. It was used to throw a number of different bombs; among them were the No. 15, No. 26, No. 33, and some developed specially for the Spring Gun.

The elevation of the throw was governed by the height of the elevation screw on the bomb cup, the lower the screw the higher the flight of the bomb, the higher the screw, the lower the flight of the bomb. By the use of this, the time of flight of the projectile could be governed, for bombs with a short fuze raise the screw so the flight is lower and consequently of shorter duration.

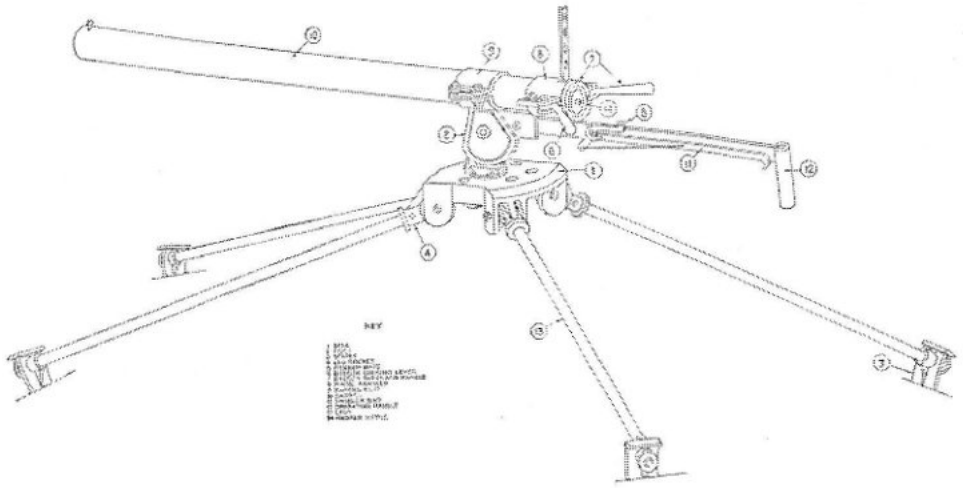
Range was governed by the tension of the 24 springs, which could be adjusted by moving locknuts on a graduated tension screw. The graduations were marked in 100ths of maximum tension or range. In addition, a slightly longer range could be obtained by adding up to 4 springs on the centre bars of the spring frame. If less than one half of the maximum range was required, springs could be removed in pairs, one from the front and one from the back. This ensured the spring pressure remained balanced.

Direction of throw was adjusted somewhat by loosening wingnuts on the base frame and traversing the gun left or right. The traverse was limited, being only about 15 yards either way for every 100 metres of range. Once the desired direction was obtained the wingnuts were tightened down. A pointer and dial on the base assisted in controlling the direction.

The Spring Gun did not stay in service for long, by March 1916 it was virtually out of service, being replaced by the 3 inch Stokes Trench Mortar. The West Spring Gun and the Leach Catapult were both dropped as service equipment on 13 July 1916.

Northover Projector

Britain lost huge amounts of equipment on the beaches of Dunkirk leaving them short of all types of weapons, especially anything with which to fight tanks. During the "Fear of Invasion" time following Dunkirk, many weapons were submitted by a variety of sources; the Northover Projector was one of these. Designed by a Major H. Northover of the Home Guard, some 21000 projectors were eventually produced. By August of 1941 there were 8000 in service with the Home Guard. Whether it was ever issued to the Regular Army is unknown to me, but it seems likely that it was, at least in the early



Northover Projector

1- Base 2-Pivot 3-Spades 4- Leg Socket 5- Breech Ring 6-Breech Locking Lever
7- Breech Block and Handle 8- Firing Hammer 9- Barrel Clip 10- Barrel
11- Trigger Bar 12- Operating Handle 13- Legs 14- Primer Nipple

stages of the War. It was designed to fire another of the "Fear of Invasion" stores, the "AW Bomb", otherwise known as the No. 76 grenade. It was also able to fire the No. 68 AT grenade and reportedly the No. 36M Mk. I fitted with a gascheck. Apparently some of the Northover Projectors were even mounted on merchant ships and fishing vessels to be used as an Anti-aircraft weapon firing the No. 36 grenade. The thought was that the grenade would be fired to explode in front of the attacking aircraft acting as a deterrent if nothing else. The success of this is not known but one can use his own imagination about it.

The projector was basically a smooth bore cannon with a rudimentary breech mechanism weighing a total of 60 pounds. It was mounted on a four-legged mount that weighed another 74 pounds. The barrel assembly consisted of a barrel, breech mechanism, traverse and elevation mechanism, and sights. A trigger bar assembly consisted of a grip, trigger bar, and hammer. The mount was constructed of steel tubing and iron castings. The steel tubing legs are attached at the top to an iron base plate. The bottom of the legs each have a cast iron foot to prevent them sinking into soft ground and provide a more stable platform. The mounting head has a socket in the centre to fit a pivot on the traverse and elevation mechanism.

The foresight consists of a circular disc; the rear sight has six circular apertures at varying heights marked for ranges of 25, 50, 75, 100, 150, and 200 yards.

The projector is assembled by spreading the legs of the mount out to position as determined by stops on the base plate. Insert the pivot in the socket. Put the trigger bar in position and bolt it to the barrel assembly. Finally screw the foresight into the hole at the muzzle end of the barrel. Instructions for assembly were attached to each projector when issued.

The propelling charge was constructed of a millboard washer, three fibreboard rings, a sponge rubber disc and a black powder charge contained in a celluloid capsule. The millboard washer formed the base of the charge with the black powder charge fitting into the hole in the washer. Three millboard discs top the washer, the bottom one hollowed out for the charge. Finally a sponge rubber disc is cemented on top of the fibreboard discs to provide a cushion.

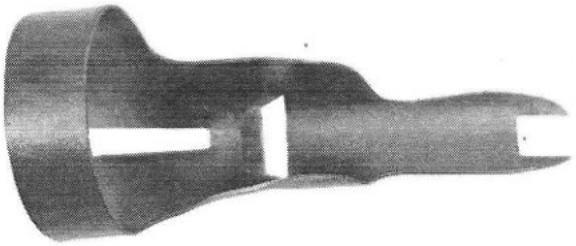
To load the projector; open the breech by an outward movement of the breech operating lever and breechblock handle. Opening the breech forces the hammer into the cocked position. Place the grenade in the breech leaving the base slightly protruding from the breech. Insert the propelling charge into the breech and push in until the base is slightly protruding from the breech. This ensures the grenade and propelling charge are in contact with each other. Close the breech and ensure it is locked by means of the breech operating lever. As the breech is closed, nipples on the breech puncture the cellophane opening the propelling charge. When the breech is closed and locked, put a musket cap on the nipple. When the trigger is operated, the hammer strikes the musket cap causing it to fire. The flash from the musket cap ignites the black powder propelling charge, which then propels the grenade out of the barrel. The maximum range of the projector was about 300 yards with an effective range of 200 yards.

Cup, No. 23 Rifle Grenade, No. 1 Mk. I [L]

This cup is designed to fit on the S.M.L.E Rifle (No. 1 Mk. III). The full designation of the cup is "Cup, No. 23 Rifle

Grenade, No. 1 Mark I; Steel, for Rifles, Short, M.L.E., with sword-bayonets, pattern 1903 and 1907, fixed".

The cup consisted of a one piece stamping of sheet steel. Three slots on the bottom of the cup allow the bayonet to hold the cup on the rifle. A thin longitudinal slot at the front fit the blade, a slot in the middle fit the bayonet ring, and a slot on the rear fit around the bayonet lug on the rifle. The front of the cup is formed into a large ring to hold the safety lever.



Cup, No. 23 Rifle Grenade, No. 1 Mk. I

To fit it on the rifle, fit the bayonet ring through the middle slot with the blade in the front slot, fit the bayonet and cup over the bayonet ring boss on the rifle and onto the bayonet lug. Ensure the bayonet is locked onto the rifle and the cup is secure.

For use:

-screw the 5.5 inch rod into the base of the grenade.
-fit the grenade rod into the barrel and push the grenade fully home, ensuring the safety lever is held secure by the ring of the discharger and the lever is opposite to the bayonet blade.
-load the rifle with the appropriate launching cartridge
-pull the pin of the grenade
-aim and fire the rifle.

When the rifle is fired, the gases formed by the launching cartridge apply pressure to the bottom of the rod. The pressure propels the grenade out of the cup allowing the safety lever to fly off and operate the grenade in the normal manner.

Cup, No. 23 Rifle Grenade, No. 2 Mk. I [L]

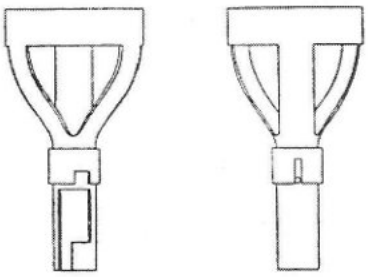
This model was designed and designated but not approved for service. Its full designation is " Cup, No. 23 Rifle Grenade, No. 2 Mark I; Steel, for use on Rifles C.L.L.E., Mark I*, without sword-bayonet fixed". It was designed for the SMLE but did not require the bayonet to hold it on. It had a ring on the front end, a ring to fit the bayonet boss on the rifle and a clip assembly to fit over the bayonet lug holding the discharger on the rifle.

Cup, No. 23 Rifle Grenade, No. 3 Mk. I [L]

This model was designed and designated but not approved for service. Designed for the Canadian Ross Rifle it likely was not approved for service due to the Ross being taken out of front line service except as a sniper rifle. The full designation was "Cup, No. 23 Rifle Grenade, No. 3 Mark I, Steel, for use on Rifles, Ross, Mark III, without sword-bayonet fixed".

Cup, No. 23 Rifle Grenade, No. 4 Mk. I [L]

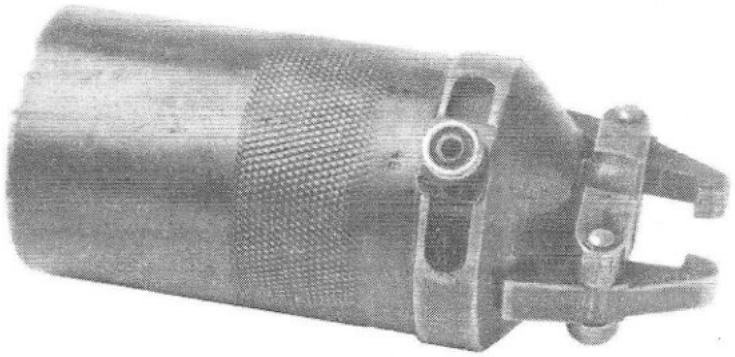
This model was constructed for use with the P14 rifle (No. 3 Mk. I). The discharger is steel with the cup formed of three supports attached to a ring at the front and a tube at the rear. The tube has a cutout that fits around the foresight of the rifle. A sleeve that fits over the tube and is located at the top end of the tube slides back to lock the discharger onto the rifle. The cup is about 5 3/8" long and 2 3/4" wide at its widest point. The full designation was "Cup, No. 23 Rifle Grenade, No. 4 Mark I, Steel, for Rifles, Magazine, .303-inch, pattern 1914, without sword-bayonet fixed".



Cup, No. 23 Rifle Grenade, No. 4 Mk. I

Discharger, Grenade, 2.5 inch, No. 1 Mk. I

This discharger is designed to fit the No. 1 S.M.L.E. rifle. It was designed and used during the First World War then dropped in favour of the 2" Discharger cup, then readopted when the 2" cup was dropped in 1933. It is capable of firing



Discharger, Grenade, 2.5 inch, No. 1 Mk. I
Photo - Clive Law

a range of grenades including the No. 36, No. 27, No. 37, No. 68, and others including illumination and smoke grenades. It remained in service from 1917 to 1947 in land service and to 1956 in Naval service.

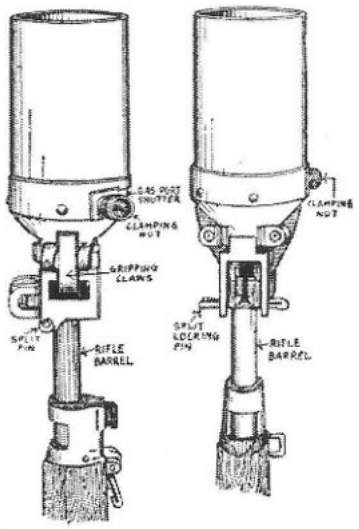
The discharger consists of two main parts, the barrel, and the locking piece. The barrel is cylindrical and internally threaded to receive the locking base. It has an internal diameter of 2.5 inches. A slot near the bottom end is fitted with a sliding shutter that is locked by means of a clamping nut; the assembly forming the gas port.
The locking piece is externally threaded to fit the threading in the barrel assembly. A central hole through the base is threaded to accept an adjusting screw that has a slot on the top to fit the point of a bayonet. Two claw levers that engage the nosecap of the rifle are fitted to the lower end of the locking piece.

The discharger is attached to the rifle by unscrewing the locking piece about three turns and ensuring the adjusting screw is screwed back an eighth of an inch within the locking piece. Place the discharger on the rifle so that the recess in the locking piece fits over the bayonet boss. Screwing the barrel down tightly causes the claws to engage the nosecap holding the discharger in position. Then the adjusting screw is turned clockwise until it is tight. If the barrel is cool the adjusting screw is then unscrewed one full turn.

When firing the No. 36 or smoke grenades the rifle is held at a 45-degree angle and ranges are set by using the gas port. There are no graduation on the gas port, the firer must estimate its position and adjust if necessary. A fully open port gives a range of 80 yards, 3/4 open 110 yards, 1/2 open 140 yards, 1/4 open 170 yards and fully closed 200 yards. When firing signal, illumination, or anti tank grenades the gas port is fully closed.

British manufacturers of this discharger during the Second World War are listed as Adams Bros. & Burnley and Lightfoot Refrigeration.

There was an **"Adapter, Discharger, 2.5 in. Grenade No. 1"** developed to adapt the No. 1 Mk. I discharger for use with the P14 or P17 rifles. It is constructed of gunmetal and made to slide over the muzzle of the rifle. It is held in position by a bolt and wing nut or split pin that passes through the adapter and behind the foresight guard on the rifle. Two slots in the sides of the adapter accommodate the levers of the discharger which is then assembled to the rifle in the normal manner. These adapters were manufactured by Pegles Ltd, Hugh Campbell, J. Stone & Co., and Alite foundry.



Adapter, Discharger, No. 1

Discharger, Grenade, 2.5 inch, No. 2 Mk. I

This discharger may be fitted to the No. 1 S.M.L.E., No. 3 (P14), or P17 rifles. It is capable of firing a range of grenades including the No. 36, No. 27, No. 37, No. 68, and others including illumination and smoke grenades.

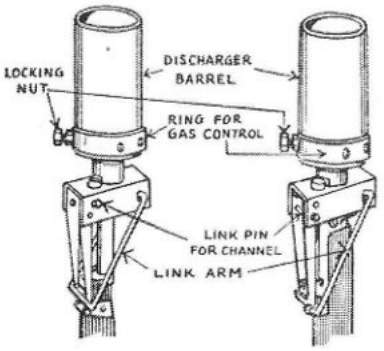
The discharger consists of a barrel, a ring used to adjust the gas, and a base. The barrel is internally threaded to match external threads on the base. One end of the base has two sets of holes, one marked "P14", the other "No. 1". A channel link is attached to the base by a pin through one of the sets of holes. The other end of the base has the link attached to it. The ring at the base of the barrel has four holes that

correspond with four holes in the barrel. The ring is held in place by a locking bolt.

To attach it to a rifle the barrel is unscrewed six full turns. The channel link is positioned in the appropriate set of holes and the discharger placed on the rifle with the channel link over the bayonet stud and the barrel screwed down finger tight.

When firing anti tank or signal grenades position the gas-adjusting ring so that it covers all four holes. When firing the No. 36, hold the rifle at a 45-degree angle and vary the ranges by varying the number of holes open. Four holes open give a range of 80 yards, three holes 110 yards, two holes 140 yards, one hole 170 yards, and all closed 200 yards.

The main manufacturer of this discharger was Lightfoot Refrigeration.



Discharger, Grenade, 2.5 in. No. 2 Mk. I
Fitted to P14/P17 on the left
Fitted to SMLE on the right

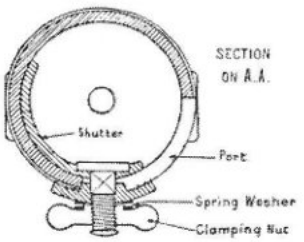
Discharger, Grenade, 2.5 inch, No. 3 Mk. I

This discharger is designed for use with the No. 4 rifle. It is capable of firing a range of grenades including the No. 36, No. 27, No. 37, No. 68, and others including illumination and smoke grenades.

The discharger consists of three main parts, a barrel, locking sleeve, and locking catch. The barrel is attached to the locking sleeve by two round-headed bolts that extend into a cannelure machined around a projection on the barrel.

The discharger is fitted onto the muzzle of the rifle over the bayonet lugs. It is locked onto the rifle by depressing the locking catch and rotating the locking sleeve until the catch engages into a slot marked "SECURE". When removing the discharger, depress the catch and rotate the sleeve until the catch engages a slot marked "FREE".

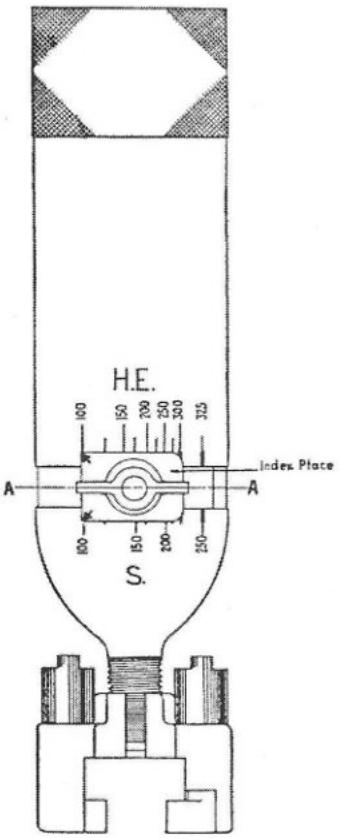
This discharger was manufactured by the Wembley Tool Co. and British Vacuum Cleaner Co. There were 10600 of the dischargers manufactured by the two companies, likely the total production.



Discharger, Grenade, Rifle, 2 inch, No. 1 Mk. I

This discharger was designed during WWI and was available in experimental quantities from 1917. It was adopted in 1925, to replace the 2.5 inch models. It remained in service until declared obsolete in 1933 when a decision was made to return to the 2.5 inch dischargers. It was designed to fire the No. 54, No. 55, No. 56, and signal grenades that were being developed.

The discharger consists of a barrel, shutter, and bridgepiece. Originally it was designed for use with a clinometer, but it was found to be difficult obtaining short ranges without a means of controlling the initial velocity of the grenade. The barrel was redesigned with a port and shutter assembly. Two range scales are engraved on the edges of the port, one for use with the No. 54 HE grenade, the other for the smoke grenade. The scales are marked "HE" or "S". The shutter is set for range using the scales and tightened with a wing nut. A threaded neck at the base of the barrel is press fitted with a hardened steel bush, coned at the mouth. When the barrel screws into the bridgepiece the bush seats on the muzzle of the rifle. The bush takes the main hammering action of recoil and blast of the propellant gasses. The bush is replaceable when worn.



Discharger, Grenade, 2 inch
No. 1 Mk. I

The discharger is attached to the rifle by means of the bridgepiece. The bridgepiece is semi permanently attached to the muzzle of the rifle with claw bolts engaging in the cutouts of the nosecap on the rifle. The bolts are secured with feathered nuts. The bridgepiece is internally threaded for attachment of the barrel. The bridgepiece has a cutout to afford clearance for the bayonet ring. The discharger may be mounted and used without removing the bayonet from the rifle.

Sight, 2.5 inch Grenade Discharger, Mk. I

This sight is designed to fit the No. 1 S.M.L.E. rifle for use with the No. 68 anti tank grenade. The sight has a "V" notch on top of the stem and is designed for ranges between 75 and 100 yards. The sight is mounted by turning over the leaf of the backsight completely toward the muzzle, loosening the wing nuts, and placing the bar on the base of the sight between the backsight ramps with the sight to the front. The metal band is then placed completely around the woodwork and the wingnuts tightened evenly.

Sight, 2.5 inch Grenade Discharger, Mk. II

This sight is designed to fit the No. 1, No. 3, or P17 rifle. The sight is fitted to the No. 3 or P17 immediately in front of the outer band, on the No. 1 immediately behind the outer band. The sight has two sighting notches on top of the stem. The top is used with the No. 1 and No. 3 .303 inch rifles, the bottom step with the P17 .30 cal. Rifle.

Sight, 2.5 inch Grenade Discharger, Mk. III

This sight is designed to fit the No. 4 rifle. The main difference between this sight and the Mk. II is the length of the blade, this one being about 1 inch shorter. The sight is mounted immediately in front of the lower band on the rifle. The sight is set for a range of 75 yards.

Projector, Grenade, No. 4 Rifle Mk. 1

In 1946 about 26 of this particular launcher were made by Sharp & Wright Ltd. This was obviously a test lot but the launcher was not adopted for service use.

Projector, Grenade, No. 4 Rifle Mk. 2

This projector was introduced for the No. 4 rifle but was not taken into British service. It was however approved for Indian service.

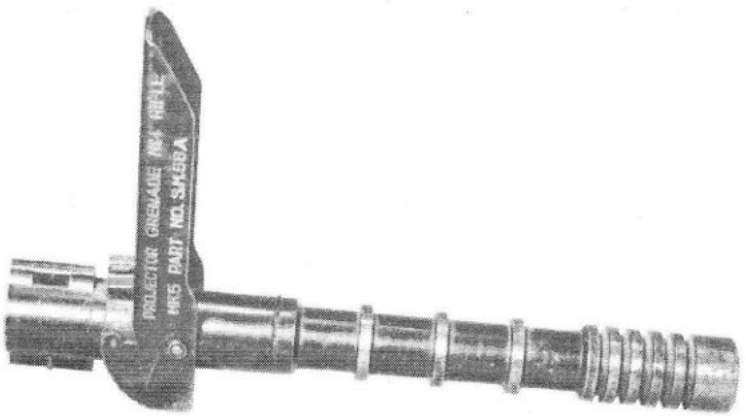
Projector, Grenade, No. 4 Rifle Mk. 3

Approved for use in 1952, these projectors were manufactured in Belgium by Mecar. The Mecar logo is found on the side of the sight. This Mark differs from the Mk. 4 and 5 only in the sight, however I have not been able to determine the details of the Mk. 3 sight.

Projector, Grenade, No. 4 Rifle Mk. 4

This projector is designed to fit the No. 4 rifle. It is primarily designed to fire the No. 94 grenade but could be used for any of the rifle launched grenades designed for firing from a spigot launcher. It was approved for use in 1952.

The rear of the projector consists of a hinge that fits over the barrel and bayonet lugs of the rifle and a milled nut to secure the projector. The sight is attached immediately in front of



Projector, No. 4 Rifle, Mk. 5

the hinge. The barrel of the projector has an outside diameter of 22mm and has a spring clip in a groove near the bottom end to retain the grenade on the launcher. The sight can be raised or lower as required but must be raised to fit a grenade on the launcher. The sight is 1.5 inches wide. The sight has an opening in the bottom to allow normal rifle sights to be used with the launcher mounted. Two triangular projections in the lower opening give a range of 25 yards. On the upper half of the sight there are three semicircular rings to give ranges of 50, 75, and 100 yards. In addition there are two uprights in the centre of the sight.

The projector is mounted on the rifle by raising the sight, unscrewing the milled nut, opening the hinge, fitting the projector over the barrel as far as possible and closing the hinge over the bayonet lug. The milled is then engaged and screwed down to secure the launcher.

Grenades must only be launched using the appropriate launching cartridges; use of the wrong cartridge can lead to unsafe pressure buildup in the rifle producing a serious hazard to the firer. Normal ball ammunition may be fired through the launcher when no grenade is fitted. It will cause the round to land approximately 10 inches low at 100 yards.

These launchers were all made in Belgium by Mecar. The Mecar logo will be found on the lower left of the sight.

Projector, Grenade, No. 4 Rifle, Mk. 5

This projector is designed to fit the No. 4 rifle. It is primarily designed to fire the No. 94 grenade but could be used for any of the rifle launched grenades designed for firing from a spigot launcher. It was approved for use in 1952.

The rear of the projector consists of a hinge that fits over the barrel and bayonet lugs of the rifle and a milled nut to secure the projector. The sight is attached immediately in front of the hinge. The barrel of the projector has an outside diameter of 22mm and has a spring clip in a groove near the bottom end to retain the grenade on the launcher. The sight can be raised or lower as required but must be raised to fit a grenade on the launcher. The sight is one inch wide. The sight has three semicircular rings for ranges of 50, 75, and 100 yards as well as two triangular projections for a range of 25 yards. The lower half of the sight is open to allow the use of normal rifle sights.

The projector is mounted on the rifle by raising the sight, unscrewing the milled nut, opening the hinge, fitting the projector over the barrel as far as possible and closing the hinge over the bayonet lug. The milled is then engaged and screwed down to secure the launcher.

Grenades must only be launched using the appropriate launching cartridges; use of the wrong cartridge can lead to unsafe pressure buildup in the rifle producing a serious hazard to the firer. Normal ball ammunition may be fired through the launcher when no grenade is fitted. It will cause the round to land approximately 10 inches low at 100 yards.

These launchers were all made in Belgium by Mecar. The Mecar logo will be found on the lower left of the sight.

Projector, Grenade, No. 5 Rifle Mk. 1

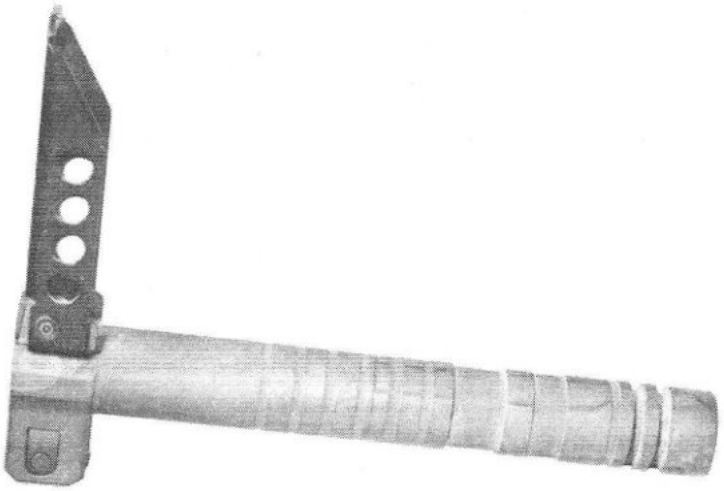
This projector is designed to fit the No. 5 (Jungle Carbine) rifle. There are two main manufacturers, Sharp & Wright Ltd, who produced them in 1945, and Baker Perkins Ltd. Total production between the two manufacturers is about 35000.

The barrel is similar to the No. 4 launchers but the mechanism to attach it to the rifle is quite different. A projection on the rear is designed to fit inside the cone shaped flash eliminator of the rifle and provides a tight gas seal. The clamp then hinges down and over the flash eliminator to secure the launcher.

This launcher does not have sights attached; it is normally used in conjunction with a special set of sights that fit on the left side of the rifle. A slip on rubber shoulder pad is also issued.

Launcher, Grenade, L1A2

This launcher is designed to fit the L1A1 rifle in British, Australian, and New Zealand service and the C1A1 in Canadian service. It was adopted in about 1955 along with the adoption of the rifle. It is primarily used for launching the No. 94



Launcher, Grenade, L1A2

grenade but may also be used to launch fragmentation and smoke grenades when they are fitted with an adapter.
The launcher consists of a barrel with folding sight and a bayonet type catch. The launcher is fitted on the rifle over the flash eliminator. The catch, mounted on the bottom of the launcher engages the bayonet lug of the rifle. The sight is graduated in 25 yard increments from 50 to 100 yards. Ranges of up to 180 yards may be obtained firing the anti tank grenade and up to 250 yards when firing smoke or fragmentation grenades. The lower portion of the sight has an opening to allow the use of normal rifle sights.

Normal ball ammunition may be fired through the launcher when no grenade is fitted. Grenades are launched using special launching cartridges normally supplied with the grenade.

Australian production

The Australians attempted to manufacture spigot launchers to fit the No. 1 rifle. There were two models, one with an attachment mechanism similar to the No. 1 Mk. 1 discharger, which attached to the nose cap of the rifle in the lightening slots, the other that was mounted on a bayonet hilt. The bayonet fitting is basically a modified bayonet handle with the spigot mounted above the bayonet boss.

The first model was successful and was used in combat. There are photos showing the launcher in action by Australian soldiers, in all cases showing them firing the US M9A1 grenade. A million M9A1 grenades were supplied by the USA to British and Commonwealth forces under the lease-lend programme.

The bayonet mount launcher was not successful in testing and was not adopted for service.

Canadian Production

Canada did not produce any of their own dischargers or launchers; instead Canada adopted British and Belgian produced dischargers and launchers.

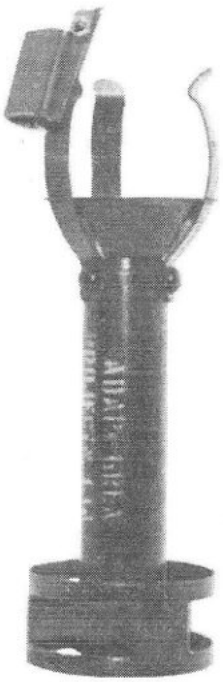
Indian production

It is known that the No. 1 Mk. I discharger was manufactured at "Rifle Factory Ishapore" but whether India produced any other types is not.

Adapter, Grenade Projection, L1A1

These adapters were designed to adapt the L2 anti personnel grenades for firing from a rifle. The British adapters are virtually identical to the American M1A2 adapters and are interchangeable in use.

The adapter consists of a fin assembly, stabilizer tube, cup, and three metal claws. The fin assembly is spot welded to the open (bottom) end of the stabilizer tube, the cup and claws to the opposite end. The fin assembly and supporting brackets are formed of a single piece of



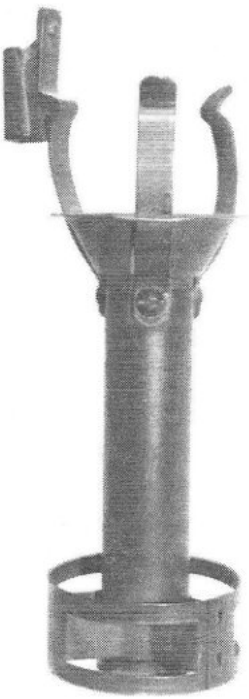
Adapter, L1A1

sheet metal, stamped out and spot welded together to form a ring. The stabilizer tube is simply a sheet metal tube with an internal diameter of 22mm. The top end is closed by a heavy metal plug that absorbs the force of launching. The cup is formed by stamping it out of a piece of sheet metal. Three tabs are formed by cutting out a three sided rectangular hole immediately below the slots for the claws leaving the bottom end attached. The tabs are bent down to fit over the tube. The three claws are attached to the adapter by fitting them through slots in the cup and riveting them onto the tube. The rivets fit through holes in the claw then the tabs, and finally into the plug at the top of the tube. An arming clip is attached to the longest of the claws, held in place by a small extension of brittle metal.

The adapter is painted dark forest green with markings in white. The painted markings give the designation "ADAPT GREN PROJECTON L1A1". The lot number, containing the date of manufacture is stamped into the outer ring of the fin assembly.

Grenades are fitted into the adapter by placing the safety lever into the arming clip and forcing the grenade down into the claws until the base of the grenade fits fully into the cup. These adapters are for use only with a ballistite cartridge. On firing the arming clip moves rearward striking the small extension. The force of the arming clip striking the extension breaks it, allowing the arming clip to fall off and release the safety lever of the grenade. The grenade then functions normally.

Both L1A2 and L1A3 versions of the adapter exist, differing in the long claw assembly. Exactly what the differences are is currently unknown.



Adapter M1A2

Adapter, Grenade Projection, M1A2

These adapters are American designed and produced to adapt the M26 style grenade for projection from a rifle. The M1A2 was in use by Canadian and Australian forces. They are virtually identical to the British L1A1 adapters and are interchangeable in use. The tube on the M1A2 is about 3/16 inch shorter than the British L1A1.

The adapter consists of a fin assembly, stabilizer tube, cup, and three metal claws. The fin assembly is spot welded to the open (bottom) end of the stabilizer tube, the cup and claws to the opposite end. The fin assembly and supporting brackets are formed of a single piece of sheet metal, stamped out and punch welded together to form a ring. The stabilizer tube is simply a sheet metal tube with flared end and having an internal diameter of 22mm. The top end is closed by a heavy metal plug to absorb the force of launching. The cup is formed by stamping it out of a piece of sheet metal. Three tabs are formed by cutting out a three sided rectangular hole immediately below the slots for the claws leaving the bottom end attached. The tabs are bent down to fit over the tube. The three claws are attached to the adapter by fitting them through slots in the cup and bolting them onto the tube. Small bolts fit through holes in the claw and corresponding holes in the tabs, and finally through the tube into the plug at the top. An arming clip is fitted onto the longest of the claws, held in place by a small extension of brittle metal.

The adapter is painted olive green with markings in yellow. The painted markings give the designation "ADAPTER GRENADE PROJECTON M1A2", lot number, and year of manufacture.

Grenades are fitted into the adapter by placing the safety lever into the arming clip and forcing the grenade down into the claws until the base of the grenade fits fully into the cup. On firing the arming clip moves rearward striking the small extension. The force of the arming clip striking the extension breaks it, allowing the arming clip to fall off and release the safety lever of the grenade. The grenade then functions normally.

Launching Cartridges

Initially, rifle grenades were launched using a normal Mk. VII S.A. cartridge with the bullet removed and the mouth sealed with a plug of beeswax. The performance of these cartridges left something to be desired and special launching cartridges were quickly developed giving greater range and more consistant performance.

Cartridge, S.A., .303 inch, Rifle Grenades, 35 grains Cordite, Mk. I

This cartridge was originally known as the "Cartridge, S.A., Blank, .303 in., Rifle Grenades, Mk. I". It was designed for use with all rodded rifle grenades except for the No. 22.

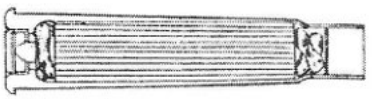
It consists of a Mk. VII cartridge case filled with 35 grains of Cordite size 3 3/4 with a tuft of guncotton (1.4 grains) at either end. A disc of cordite is then fitted above the guncotton tuft and the case closed by a tallow plug. Later issues eliminated the tallow plug and closed the end with a shellacked cardboard disc.

Cartridge, S.A., .303 inch, Rifle Grenades, 43 grains Cordite M.D., Mk. I

Originally designed for use with the No. 22 grenade this cartridge was later extended for use with all rodded rifle grenades.

The cartridge consists of a Mk. VII cartridge case filled with 43 grains of Cordite, M.D. size 4 1/2. There are two 1 grain tufts of guncotton placed at either end. The case is closed by a cardboard disc pressed down into the mouth and secured by shellack. Later issued have the casing blackened as an identification feature.

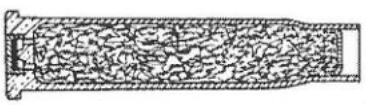
Cartridge, S.A., .303 inch, Rifle Grenades, 43 grains Cordite, M.D., Mk. II



This cartridge was used for launching rodded rifle grenades of all types and replaced the Mk. I for land service use.

The casing is the Mk. VII filled with 43 grains of Cordite M.D. stick of .033 inch diameter. Two 1 grain guncotton tufts are placed at either end of the cordite. The mouth is closed by a cardboard disc shellacked in. The casing is blackened all over as a distinguishing feature.

Cartridge, S.A., .303 inch, Rifle Grenades, Ballistite, Mk. I

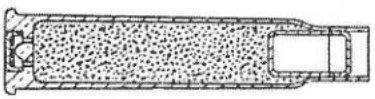


This cartridge is used only with rifles equipped with discharger cups. It must not be used for firing rodded grenades.

The casing is a normal .303 inch casing filled with 30 grains of sporting ballistite. A cupped wad closes the mouth of the casing and shellacked over to seal it.

The top half of the casing is blackened to distinguish it from cartridges designed for rodded grenades.

Cartridge, S.A., .303 inch, Ballistite, H Mk. Iz



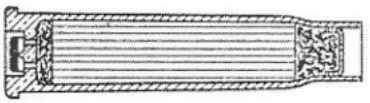
This is for use in .303 inch rifles fitted with a discharger cup, it may also be used in smoke generator dischargers when firing the No. 8 Generators.

It consists of a normal cartridge case and percussion cap. In this case the cap is not ringed into the casing. The charge is 30 grains of ballistite, 31 grains of Supertrim, or 30 grains of Hercules 81mm mortar propellent. The mouth of the casing is closed by a paper cup inserted concave side up and then by a glazedboard cup inserted concave side down. The final cup is secured in position by shellac adhesive which also acts as a waterproofing agent.

One half of the casing is blackened from the mouth down to distinguish the cartridge. The annulus is not coloured.

Cartridge, S.A., .303 inch, Cordite, H Mk. II

This cartridge is designed for firing rodded rifle grenades not for use with discharger cups.



It consists of a standard cartridge casing and percussion cap. The charge is 43 grains of quick burning cordite sticks, each stick being .033 inch in diameter. To ensure complete ignition, guncotton tufts weighing about 1 grain are placed both on top and bottom of the cordite. A cardboard cup seals the mouth of the cartridge case.

The entire casing is blackened to identify this cartridge. The annulus is not coloured.

Cartridge, S.A., .303 inch, Grenade Discharger, H Mk. III

This cartridge is designed for use in hot climates where ballistite is not suitable due to its poor stability in hot conditions.

This cartridge is constructed in the same manner as the H Mk. Iz but contains a filling of 29 grains of pistol cordite.

Cartridge, S.A., .303 inch, Grenade Discharger, H Mk. IV

This cartridge was specifically designed to fire the No. 85 grenade.

The cartridge resembles a blank cartridge with a rosette crimped end. The case is blackened on the upper and lower third leaving a brass band in the middle. The annulus is not coloured.

Cartridge, S.A., Rifle grenade, .303 inch, H Mk 7Z

This cartridge is designed for use with the No. 4 rifle for firing the No. 94 (Energa) grenade.

The cartridge casing is filled with ballistite and closed by a rosette crimped end. The casing is blackened on the lower half and has the letter "H" stamped on the base. Early issues may not be blackened nor do they have the "H" stamped into the base. The annulus may have a purple ring.

Cartridge, S.A., 7.62mm, Grenade Launcher

These cartridges were designed for use with the Self Loading Rifle L1A1.

The casing is similar to the standard cartridge casing but is closed with a crimp. The casing is blackened on the lower end as a distinguishing marking. Early issued cartridges may not be blackened and may have a purple annulus.

Cartridge, 7.62mm, Grenade Launcher F2

Australian issue. Designed for use with the Self Loading Rifle L1A1 for launching grenades. This cartridge was used for firing M26 and M34 grenades equipped with Adapter, Grenade Projection, M1A2.

The casing is similar to the standard cartridge case but its closed with a crimp. The upper half of the casing is blackened and the base is stamped "7.62 F2". Bulk packaging of the cartridges is marked "FOR ADAPTERS GREN PROJ M1A2".

Cartridge, Grenade, Rifle 7.62mm, C33

This cartridge is Canadian designed for use with the Rifle, C1A1 for launching various HE, smoke, and practice grenades fitted with the M1A2 adapters. Grenades may be projected to a distance of about 200 yards.

The cartridge case is similar to a normal cartridge case but is slightly elongated at the mouth to facilitate hand loading into the rifle. The primer is the same as used with normal ball cartridges. The loading is 42 grains of Dupont IMR 4475.

After loading the case is sealed with a disc secured by red lacquer. The case is then necked in to complete the sealing process.

The cartridge is identified by its shape and a 1/4 inch black band at the mouth. The base of the round is marked with a Nato design mark (cross in a circle), the year of manufacture, and the manufacturers marking "DA" (Dominion Arsenal).

Fillings

Grenades have been filled with many different explosives and compounds through the years. This listing gives brief descriptions of some of them; unfortunately I have not been able to find information on all the different fillings.

AMATOL- Used as a bursting charge during WWI and WWII. A composition of Ammonium Nitrate and TNT it is normally yellow to brown in colour.

AMMONAL- There are several "recipes" for ammonal but all formulas contain aluminum, normally in powdered form. It is a fine grey hygroscopic powder with a composition of Ammonium Nitrate, TNT, Aluminium Powder and Charcoal. Ammonal does not freeze and is not effected by normal shock. It will not detonate if hit by a bullet nor will it detonate if wet.

ALUMATOL- A hygroscopic silver grey powder having a composition of Ammonium Nitrate, TNT, and Aluminum powder.

BALLISTITE- Invented in 1888 by Alfred Nobel. Compositions vary, 1- Nitro-Cotton of low nitration gelatinized with Nitro Glycerine. 2- Blasting Gelatine with proportion of Nitro Cellulose largely increased. 3- Gun-cotton, plus camphor, plus Vaseline.

BARATOL- Used as a bursting charge. It is a composition of Barium Nitrate and TNT. Baratol is normally yellow to brown in colour.

BELLITE- This explosive is of Swedish origin. It consists of 20% dinitrobenzene and 80% nitrate of ammonium.

CHEDDITE- Cheddite was patented in 1897 by F.A.D. Street. It consists of potassium chlorate mixed with castor oil in which aromatic nitro-compounds are dissolved. It is not highly sensitive to shock or friction. It easily becomes hard and then does not completely detonate.

CILFERITE- A hygroscopic powder that is not effected by high temperatures. It is composed of Ammonium Nitrate, Ferro-silicon, Aluminum powder, and Wood Meal. Used in No. 36M grenades.

CN- Chloracetophenone. This is a lachrymatory (tear) gas that produces severe burning sensations in the eyes. This may be combined with DM.

COMPOSITION B- This explosive filling consists of 60% RDX, 39% TNT, and 1% wax. Used as a bursting charge in many post war grenades, this explosive is yellow to brown in colour.

CORDITE- Invented by Sir F. Abel and was adopted by Austria-Hungary in 1893. A high explosive or comparatively slow rate. Designed mainly for propulsion. Burns freely on ignition but will not explode without detonation. It is a mixture of highly nitrated gun-cotton, nitro glycerine, and vaseline gelatinized by means of acetone.

CS- CS has a powerful lachrymatory effect. It is irritating to the upper respiratory tract, causes coughing, difficulty in breathing, and tightness in the chest. In heavy concentrations it will cause nausea and vomiting. Incapacitation will begin in 15-20 seconds and its duration is less than 10 minutes after removal to fresh air.

DYNAMITE- Common commercial high explosive. Consists of nitro glycerine absorbed in sawdust, Fullers earth, cellulose etc. Dangerous at extreme temperatures or when wet. Very susceptible to shock.

FM- Fuming Mixture, see Titanium tetrachloride.

FULMINATE OF MERCURY- Its appearance is like fine sand. It is a very unstable explosive normally used in detonators. It is highly susceptible to heat or shock. White in colour when pure, normally grayish with a yellow tint.

GUNCOTTON- This was invented in 1846 by Shombeir, a Professor of Chemistry at Basle. Nitro-cellulose, consists of

cotton waste that is purified, dried and heated with a mixture of concentrated nitric and sulphuric acid. It is washed and reduced to a pulp and moulded into slabs or primers. Dry, it will explode if hit with a bullet, wet, it will not. It is 2.5 times as powerful than gunpowder unconfined, 7-8 times if confined.

GUNPOWDER- One of the oldest known explosives. This is a mixture of potassium nitrate, sulphur, and carbon. These items are mixed together by grinding and other operations. Some gunpowders are black, brown, or slate coloured, mainly due to the different types of carbon (wood charcoal) used. Gunpowder is graded by size of granules and designated accordingly. The percentages of ingredients varies but is normally 75% nitrate, 15% carbon, and 10% sulphur.

HC SMOKE COMPOUND- Hexachlorethane-zinc mixture (Canadian formula) 43% Hexachlorethane, 4.5% Potassium Nitrate, 15% Calcium Silicide and 37.5 % Zinc Oxide. This mixture produces a dense cloud of white smoke when ignited. The smoke is harmless in normal concentrations. If this filling comes into contact with moisture, a chemical reaction can occur which causes the filling to spontaneously ignite.

HILLITE- A powder that causes sneezing and watering of the eyes. The powder is composed of light magnesium carbonate mixed with concentrated essence of red pepper.

LYDDITE- It consists of picric acid melted in vaseline and solidified. It is very poisonous and great care must be taken when handling it. It is hygroscopic and loses its power when wet.

NITRO-GLYCERINE- Discovered in 1847. It is a heavy, oily liquid that is colourless when pure. The commercial product is normally yellow. It is not hygroscopic and is almost insoluble in water. Does not dissolve oils, mineral jelly or sulphur. In liquid form it is too dangerous for use. It will explode at 360 degrees F. When absorbed in Fullers earth or other fillers it is called Dynamite.

PETN- Pentaerythrite Tetranitrate- This is a powerful explosive that is highly sensitive. PETN is used in boosters, detonating cord, and some blasting caps. It is nearly insoluble in water. White or Light buff in colour.

PICRIC ACID- A yellow crystalline in form. It is a by-product of gas manufacture; the heavy oil of coal tar is boiled and chemically treated resulting in carbolic acid. Nitric acid is carefully added to the carbolic acid, resulting in Picric acid. It is a safe and very powerful explosive. It does however form "picrates" with metals or acid salts, which are more sensitive to disturbing influences than the picric acid itself. When used in shells or grenades, the insides of the metal is varnished to prevent the formation of picrates.

PN 468A- A green smoke composition consisting of Sucrose, Potassium Chlorate Grade II, yellow and green dye.

PN469A- A red smoke composition consisting of Sucrose, Potassium Chlorate Grade II, yellow and violet dye.

PN 471A- A blue smoke composition composed of Sucrose, Potassium Chlorate Grade II, and blue dye.

PN490A- A green smoke composition consisting of Sucrose, Potassium Chlorate Grade II, yellow and green dye.

PN 757- Red smoke composition consisting of Lactose, Potassium Chlorate grade II, red dye, and Kaolin Colloidal

PN758- Blue smoke composition consisting of Lactose, Potassium Chlorate grade II, blue dye, and Zinc Oxide

PN759- Green smoke composition consisting of Lactose, Potassium Chlorate grade II, green dye, yellow dye, and Zinc Oxide

PN760- Orange yellow smoke composition consisting of Lactose, Potassium Chlorate grade II, yellow dye, orange dye, and Zinc Oxide.

QUICK MATCH- This is made by boiling three strands of cotton wick in a liquid containing mealed powder and gum. It is then dusted with mealed powder before it gets dry. They are then enclosed with flax to carry the flame along rapidly.

RDX- (Research Department Explosive) Developed in the Research Department of Woolwich Arsenal. One of the most

powerful military explosives. It is highly sensitive with great shattering effects. Normally used in composite explosives and blasting caps. White in colour.

SLOW MATCH- This is made by steeping a rope in a solution of saltpetre (potassium nitrate) and limewater then allowing the rope to dry. It will then burn at approximately one foot per hour.

SR252- (Canadian formula) A priming compound made up of Potassium Nitrate, Silicon, and Gunpowder, sulphurless mealed.

TETRYL- A powerful high explosive used in boosters, as a component in mixed explosive, and as a base charge in detonators. Light yellow in colour. It is a coal tar product containing more nitrogen than TNT or Picric Acid but is also more sensitive.

TITANIUM TETRACHLORIDE is a smoke chemical agent used as far back as WWI. It is a liquid and used for screening smoke, not signaling smoke. It is a colourless to light yellow fuming liquid with a very pungent odor. It is corrosive and will damage the eyes, nose, and throat. Extreme exposure can cause lung failure and death, but that is rare. Also known as FM.

TNT- Used as a bursting charge, as an ingredient of composition explosives, or as a demolition charge. TNT is light yellow to buff in colour.

TONITE- This is formed by impregnating guncotton with one or more nitrates.

TROTYL- This is the German name for TNT. The British also used this term for TNT.

TWH526- (Canadian formula) This is a mixture of Potassium Nitrate Grade 2, Hexachlorethane, Zinc Oxide, and Calcium Sillicide.

WESTONITE- Produces a localized effect that is most effective in dry weather. The compound is formed of sulphur chloride and bromine saturated with chlorine. When grenades filled with this detonate, a combination of gases is produced including chlorine, bromine, hydrochloric acid, and sulphur chloride. Produces coughing and partial suffocation in effected troops.

WHITE PHOSPHOROUS- White phosphorous (WP) also known as Yellow Phosphorous is normally a solid at normal temperature. It is a transparent solid that normally has a white/yellow crust on it. When exposed to light it darkens on the surface. It boils at 280 degrees F and will ignite by itself at 30 degrees F. When cut off from air (underwater, oil, wet sand, etc.) it will not burn and can be handled. Once exposed to air it will ignite spewing out burning particles as it burns and is very difficult to extinguish, except by covering it with water.

Markings

Markings are an important factor in identifying grenades and other ordnance items. Both painted and stamped or embossed markings may be found. These markings can identify a number of things, type, manufacturer, designation, filling, date of manufacture, date filled and other things. Grenades are marked in a number of ways that must be understood before it makes much sense. There are two basic styles of marking on British grenades. The old style of marking was British in origin and use and was also used by Commonwealth forces. The new style of marking is NATO standard. There are however, variations to the marking systems that will be found throughout the text in the book. Basically British markings follow a fairly set pattern as follows.

Old Markings

HE grenades-	unpainted but may be varnished to look brown
Gas grenades-	Grey overall colour, markings in red
Smoke grenades-	Mid Green overall colour, markings in black
Drill grenades-	White or Galvanized overall colour, markings in black
Anti Tank-	Buff overall, markings in black.

Distinguishing bands

Distinguishing bands are used in combination to indicate different fillings, for example a No. 36M Mk. I grenade will have a band of red "X's" to indicate a filled grenade and a green band to indicate the filling is Baratol.

Red Band-	indicates a filled grenade, it doesn't matter what the filling is so long as it is live.
Red "X's"-	indicates a grenade filled for use in a tropical (moist) climate
Green Band-	denotes a filling of Baratol, TNT, Trotyl, or Amatol.
Pink Band-	denotes a filling of Ammonal or Alumatol
Ring of alternating "X's" and Dashes-	Indicates the filling of the item is limited to one year from date of receipt in hot climates
Hatched Red ring-	Indicates suitability in temperate climates only. (introduced in 1945)
Orange band-	Canadian, painted on Drill No. 36M Mk. I grenades to make them easier to find, especially underwater.

Identification codes

Some fillers were identified with specific codes in place of or in addition to the coloured bands. These will be found painted on the side of the grenade along with other markings and may be superimposed on distinguishing bands.

BAR	Baratol
LYD	Lyddite
PAGD	Polar Ammon Gelatine Dynamite
NG	Nitro Gelatine
PHOS	White Phosphorous
RDX/BWX	RDX/Beeswax
CE/TNT	Composition Exploding/TNT

In addition there may be a fraction indicating the percentages of the "mixture". For example "CE/TNT 35/65" meaning the filling is CE/TNT with 35 percent Compositon Exploding and 65 percent TNT.

Other markings

"Z" marked on components of a grenade- this means the particular component is made of Zinc. Most often found on components of the No. 36M Mk. I grenade, baseplugs, filling plugs, and centrepieces. Likely so marked due to the easy corrosion of Zinc alloys in certain climates.

"XR" marked on safety lever- Australian- Indicates that the fuze,once assembled and loaded, has been X-rayed to ensure the striker is in the correct position, folded out against the grenade body and under the lever.

Commonwealth Markings
Nato Markings

HE grenades-	Olive or Dark green overall, markings in yellow.
Gas grenades-	Grey overall, markings in black and red.
Smoke Grenades-	Light Green overall, markings in black.
Drill grenades-	Dark blue overall, markings in white; latest colour scheme is bronze overall with black markings.
Anti tank-	Olive green overall with yellow markings.
Practice-	Older markings are black with yellow band and white markings, newer are light blue with white markings.

In addition to painted markings there may be embossed, stamped, or raised markings on the grenade bodies and fuzes, many of these are manufacturers markings. What follows is a table containing all the British and Commonwealth markings I have been able to identify and many I have not. I have not put the markings with any particular grenade as many manufacturers made different grenades or accessories. Where the manufacturer is as yet unidentified I have left blanks in the table so it can be updated when the manufacturer is identified.

MARKING	MANUFACTURER	LOCATION/COUNTRY
AB&S LTD	A Bullows & Sons Ltd.	Walsal
ADC		
ADI	Australian Defense Industries	Australia
ADL		
A&FP	A & F Pears	Isleworth
AF		
AL&Co		
ALLEN WEST	Allen West & Co.	
AM & Co	A. Marston & Co.	Wolverhampton
AP	Astra Pyrotechnics	Kent
APDP		
APX	Royal Ordnance Factories	
A&S		
AW&Co	Allen West & Co.	Brighton
AWCo	Allen West & Co.	Brighton
A.W.O.	Albright & Wilson	Oldbury
A.W.S.	Albright & Wilson	Stourport
BARBER & SONS LTD	Barber & Sons Ltd.	
BBC	British Bath Co.	Greenford
B&D	Brooks & Doxey Ltd.	Manchester, England
BE	British Engineering Co. Ltd.	Birmingham, England
BEC LTD	British Engineering Co. Ltd.	Birmingham, England
BGL	Birmingham Guild Ltd.	Birmingham, England
B&G LD		
BGM		
B&K		
B LD	Bullers Ltd.	Tipton, Staffordshire
BP		
BRYANT	C. Bryant & Sons Ltd.	Birmingham, England
BS	Royal Ordnance Factories Bishopton	Strathclyde, Scotland
B.S.	British United Shoe Manufacturing Co. Ltd.	
BULLERS LTD	Bullers Ltd.	
BURMAN&SONS	Burman & Sons	Birmingham, England
BWL		
BW LTD	Bowden Wire	London, England
C	Chatco	
CALTHORPE	Calthorpe Motors Co. (1912) Ltd.	Birmingham, England
CALTHORPE MOTORS CO	Calthorpe Motors Co. (1912) Ltd.	Birmingham, England
C.A.V.	C.A. Vandervell & Co.	Acton Vale, London
CC	Caron Co.	
CDP		
CEW	Central Engineering Works	South Africa
C&H		
CHATCO	Chatco	
CIL	Canadian Industries Ltd.	Canada
CLA		
CMCo	Calthorpe Motors Co. (1912) Ltd.	Birmingham, England
CNF		
CPP (in triangle)	Colton, Palmer, & Preston	Adelaide, South Australia
CW	Cook & Williams	Victoria, Australia
CY	Royal Ordnance Factory	Chorley, Lancs
DAVIS & MAWSON	Davis & Mawson	Birmingham, England
DB	Dobson & Barlow Ltd.	Bolton, Lancs

MARKING	MANUFACTURER	LOCATION/COUNTRY
D & B	Dobson & Barlow Ltd.	Bolton, Lancs
DCC	Dominion Can Company	Melbourne, Australia
D.E.C.		
DFC	Dudley Foundry Co.	
DFCo	Dudley Foundry Co.	
DGS		
DHS		
DLR	Thomas De La Rue	London, England
D&M	Davis & Mawson	Birmingham, England
D&MB		
DS	David Shearer & Co.	Mannum, South Australia
	Dover Ltd.	Northhampton
E&S	Edison & Swan Ltd	
	Edison & Swan United Electric Light Co. Ltd.	
EAR & Co	E.A. Radnall & Co.	Birmingham, England
EBW		
EECo	English Electric Co.	
EF	Elmbank Foundry	Glasgow, Scotland
EFC		
ELMBANK	Elmbank Foundry	Glasgow, Scotland
E-LTD		
EN & S		
E.S.H. & S.	E.S. Hindley & Sons	Bourton, Dorset
ETAS		
ET&SW	E. Tonks & Sons Willenhall	Willenhall, Staffordshire
FAIRBANK		
FALCO	Falkirk Iron Co. Ltd.	Scotland
FALKIRK	Falkirk Iron Co. Ltd.	Scotland
FARRER		
FB	Fallows & Bate	Manchester, England
	Firth & Brown	Sheffield, England
FI Co	Falkirk Iron Co. Ltd.	Scotland
FICL	Falkirk Iron Co. Ltd.	Scotland
FLH	F. L. Hudson & Co.	Brisbane, Australia
FLI		
FPL		
FREMO	Frederick Mountford (Birmingham) Ltd.	Birmingham, England
FW	Frost & Woods	Don Mills, Ontario, Canada
F & S	Forrest & Sym	Manchester, England
G		
G & Co		
GD	Royal Ordnance Factory	Glascoed
GDP		
GE		
G.H. & Co	Geo. Hopkins & Co.	
G & ML	Glover & Mail Ltd.	
G.M. & Co. LTD		
GTL	Gestetner Ltd.	London, England
H	Hart Ltd	South Africa
HAWKINS & Co. LTD	Hawkins & Co. Ltd.	Birmingham, England
HB	Howard & Bullough Ltd.	Accrington
HBS	Royal Ordnance Factory Bishopton	Strathclyde, Scotland
H&B	Howard & Bullough Ltd	Accrington

MARKING	MANUFACTURER	LOCATION/COUNTRY
HINKS	Jas. Hinks & Son Ltd.	Birmingham, England
H. HOPE & SONS LTD.	H. Hope & Sons Ltd.	Birmingham, England
HLD	H.L. Dent	London, England
HLH		
HM LTD		
HO Co		
HOPES	H. Hope & Sons Ltd.	Birmingham, England
HT & S		
H & T VAUGHAN	H.T. Vaughan Ltd.	Willenhall, Staffordshire
H & TV	H.T. Vaughan Ltd.	Willenhall, Staffordshire
H & TY		
H & W	Haley & Weller Ltd.	
IBR	Ideal Boilers & Radiators	London, England
I.G. Co.		
IHR		
IVI	Industries Valcartier Inc.	Canada
J.A.P.	J. A. Philips & Co.	Birmingham, England
J.A. PHILIPS	J. A. Philips & Co.	Birmingham, England
J.A.S. & S Ld	James Allen Senior & Sons	Glasgow, Scotland
JAS	James Allen Senior & Sons	Glasgow, Scotland
JCCo	James Cycle Co. Ltd.	Birmingham, England
JAMES CYCLE	James Cycle Co. Ltd.	Birmingham, England
J.G.	James Gibbons	Wolverhampton
JGW		
JH		
JHW	John Harper, Willenhall	Willenhall, Staffordshire
JMD & S L	J. M. Doughty & Sons Ltd	London, England
JP&S	Joseph Parkes & Sons	Willenhall, Stafforshire
JPA	J.A. Prestwick & Co.	
K (dot in each opening)	A Kenrick & Sons	West Bromwich
L & B		
LEGGE	J. Legge & Co. Ltd	Willenhall, Staffordshire
M	Morum & Co.	London, England
M & Co	Morum & Co.	London, England
MB	Moore Bros. Ltd.	Birmingham, England
M.B. Co	Metal Box Company	
M & C/L		
MF	Munitions Footscray	Australia
MF (joined)	R & A Main, Falkirk	Falkirk, Scotland
MGM	Metropolitan Gas Meters Ltd.	London & Nottingham
M&LC Co LTD	Munitions & Light Castings Ltd.	Grimsby
MM Co.	Mills Munitions Company	Birmingham, England
MM LTD	Moris Motors Ltd.	Cowley, Oxford, England
MML LTD	Minerva Motors Ltd.	London, England
M&P	May & Padmore	
M&S	Messenger & Sons	Birmingham, England
M & SONS	Messenger & Sons	
M.T. & S		
MTY		
MY	Munitions Filling Factory, St. Marys	Australia
N-AIR	Airzone	Sidney, New South Wales
NDZ		
NIC	Wallop Industries	

MARKING	MANUFACTURER	LOCATION/COUNTRY
nPz	New Zealand Railway Workshop	Palmerston North NZ
O.M. Co.		
O.M.C. LTD		
ORB		
OSP		
PAM		
Pains Wessex	Pains Wessex Ltd.	
PDC	Patent Die Castings Co.Ltd	
PDG		
PDL (V under the D)		Believed to be New Zealand
PE		
PF	Pheonix Foundry	South Africa
POF	Pakistan Ordnance Factory	Wah Cantt, Pakistan
PSC	Parkinson Stone Co. Ltd.	
PW	Pains Wessex Ltd.	
	Phillips & Co.	Birmingham, England
Q	Qualcast	Derby
R&AM	R. & A. Main	Falkirk, Scotland
RBD	R.B. Davis & Co.	Victoria, Australia
RBO		
RD & S		
REL (in an oval)		
REVO	Revo Electric Co. Ltd.	Tipton, Staffordshire
RFI	Rifle Factory Ishapore	Ishapore, India
RING-GRIP	Ring Grip Company	Adelaide, South Australia
RIVERBANK		
RL	Royal Laboratories	Woolwich, London
ROF(G)	Royal Ordnance Factory	Glascoed
ROF(P)	Royal Ordnance Factory	Paticroft
RONEO	Roneo Ltd.	London, England
S (in a circle)		
S (in a hexagon)	J. Sankey & Sons	
S with superimposed L	Sparlets Ltd.	London, England
S.B. & Co	Seimens Bros. & Co.	
Schermuly	Pains Wessex Ltd.	
SDR	Strebor Diecasting Co.	Radcliffe
SE	Selby Engineers	South Africa
SFG		
SGB	Stourbridge Glazed Brick & Fireclay Co.	
SMC		
SP & C LTD	S. Parks & Co. Ltd.	
SQ	Brocks Explosives Ltd.	Sandquhar, Scotland
S.W. with **** above	Royal Ordnance Factory	Swynnerton
SWN	Royal Ordnance Factory	Swynnerton
TARRER		
TAS Co.		
TA & S	T. Adshead & Sons	Dudley, Worcestershire
TG & C	Thomas Glover & Co.	
TGAC		
TH LD	Thorpe Arch Ltd.	
T & S	Tweetdales & Smalley Ltd.	
UCC	Union Can Co.	Melbourne, Australia
VADIS	Davis & Brocklesbury	Manchester, England

MARKING	MANUFACTURER	LOCATION/COUNTRY
VML		
VP LD	Vickerys Patents Ltd.	Devonshire Grove, London
VP Ltd LONDON	Vickerys Patents Ltd.	Devonshire Grove, London
W	Walsall Ltd.	
W & Co.	Williams Bros & Co.	South Africa
WALSALL LTD	Walsall Ltd.	
WA & Co	Wm. Ayrton & Co.	Manchester, England
WB	Westinghouse Brake Co. Ltd.	London, England
WBL	Westinghouse Brake Co. Ltd.	London, England
WDC	Wolverhampton Diecasting Co.	
W.D. Ld		
WEB	W.E. Blake Ltd.	London, England
WEB LTD	W.E. Blake Ltd.	London, England
WE Co. Ltd	Western Electric Co. Ltd.	London, England
WMW & S Ld	William Whitney & Sons Ltd.	Yorkshire, England
WS & S	William Suckling & Sons	Birmingham, England
Y & T		
Three Woodscrews forming an "H" with "&" above bar and "Co." below the bar	Hawkins & Co. Ltd	Birmingham, England
Shape of a Hand (Red hand of Ulster)	Barbour Mills Foundry	Comber, County Downs Northern Ireland

Glossary

AFV	Armoured Fighting Vehicle
ANZAC	Australian and New Zealand Army Corps
AP	Anti Personnel
A.T.	Anti Tank
B.E.F.	British Expeditionary Force
Ballistite	A type of propellent used in rifle grenade cartridges.
Blind	A term given to ammunition that has failed to explode.
Brassard	A striker similar to the striking surface on a match box. Normally worn on the forearm it is held on by a strap or tied on using tapes.
Canuck	Canadian Soldier
Cambric	A fine white linen or similar fabric of cotton.
C.E.	Composition Exploding
C.E.F.	Canadian Expeditionary Force
Col. Sgt.	Colour Sergeant
CP	Candle Power
[C]	Combined
Digger	Australian Soldier
DND	Department of National Defense (Canadian)
dr.	Dram, (16 drams to an ounce)
g	Gram
gr.	Grain, (437.5 grains to an ounce)
HCN	Hydrocyanic acid
HE	High Explosive
in.	Inch
Kiwi	New Zealand Soldier
lb.	Pound, (16 ounces)
[L]	Land
Luting	A greasy plastic substance used as waterproofing ammunition and packaging.
Mazak	An alloy of aluminum and zinc.
mm	millimetre
Mk.	Mark
Needle Pellet	The weighted portion of a striker used in early British rifle Grenades.
No.	Number
[N]	Naval
OC	Officer Commanding
oz.	Ounce, (16 ounces to a pound)
PN	Porton, the British Chemical weapons establishment, usually refers to smoke compositions and anti riot fillers.
Primer	A small charge, usually CE or dry guncotton, used to transmit the explosive impulse of the detonator to the main charge.
RCR	Royal Canadian Regiment
RDX/BWX	RDX Beeswax
R.L.	Royal Laboratories
SOE	Special Operations Executive
SR	Superintendent of Research (old Woolwich title). Usually refers to pyrotechnic compositions but may include smoke compositions.
Star	An illuminating or signalling pellet. Sometime suspended on a small parachute to prevent a too rapid return to earth.
Stemmed in/stemming	Explosive in powdered form is added to the body in installments and lightly drifted/tapped down after each addition.
Tommy	British Soldier
truncated	Cut off or shortened.
T.W.D.	Trench Warfare Department
WOLC	War Office List of Changes

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ISBN 0-9688909-0-3